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JULY/AUGUST 1991



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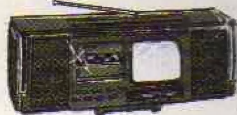
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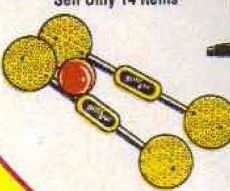
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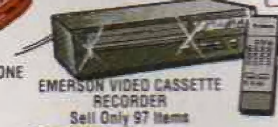
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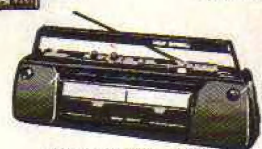
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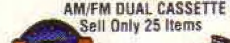
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Award Winner/Feature

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C O N T E N T S

FEATURES

- 8** Ocean Blues:
Are We Killing Our Coral
Reefs?

- 14** Splish Splash:
Water-Ride Designers
Are Making Waves

- 18** Bug Patrol:
A Scientist Stalks
Roaches

- 26** Star Tower:
A CONTACT Experiment

- 28** Tossed in Space:
All About Frisbees and
Other Flying Discs

- 37** Jungle Safari

SQUARE ONE TV

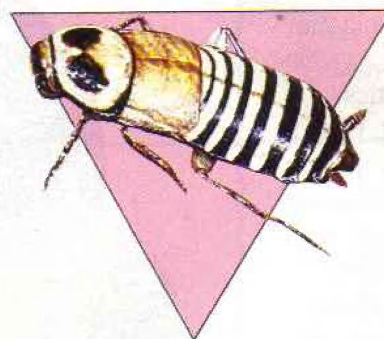
- 38** Perplexing Pieces
Puzzles

- 40** Edward Lizardhands: A
Square One Comic

- 42** Mathnet Detective Page



14



18



28

DEPARTMENTS

TNT: Newsblasts **2**

Mail **4**

Any Questions? **6**

Factoids **22**

Reviews **32**

The Time Team **34**

Contact Lens **43**

Basic Training **44**

The Slipped Disk **45**
Show

Extra! **46**

Did It **48**

ON OUR COVER

In the Belize barrier reef, a spotlight
parrotfish sleeps in its coral bed.
Photo © Doug Perrine



Reruns

How are Canadians making inroads in recycling plastic? By making plastic roads! Plastic milk jugs are now being recycled and turned into roads.

Why would anybody want a plastic road? The plastic is actually added to asphalt—a material that many roads are made of. This helps make the asphalt stronger and more flexible. So that means no big potholes.

Plastic roads aren't new—oil companies already sell a special plastic for making asphalt stronger. But turning old plastic into roads *is* new.

Even so, recycled plastics aren't paving the way yet. Only a few roads are paved with this kind of asphalt. An experimental stretch of highway—one of Canada's busiest—has been paved with the recycled plastic. The results aren't in yet, but who knows? If it does work, more cars may start running on empty... plastic jugs, that is.

Story suggested by Katie Miller, Glencoe, MO.



Searching Lincoln's Roots

Imagine being able to find out if Abraham Lincoln had health problems just by looking at a few samples of his hair, blood and bones. Sounds impossible? Not anymore.

Scientists now may be able to study Lincoln's body tissues to answer some questions about his health and how it might have affected his job as President. (Some experts believe Lincoln had a serious, rare disease.)

The National Museum of Health and Medicine has a collection of Lincoln's tissue. The samples include two locks of hair, some blood stains and seven bone chips (*see large photo*) from the head wound caused by the President's assassin.

The scientists don't know if there's any DNA left in the 126-year-old tissue. (DNA is found in every living cell and determines the body's traits.) If any is found, scientists will copy the DNA thousands of times until there is enough to work with.

But testing will destroy some of the samples. Even so, many scientists hope that museum officials will allow these tests.

"For more than 20 years, there have been debates about Lincoln's health," says Dr. Mark E. Neely, Jr., a Lincoln scholar. "It's exciting to think we may finally be able to examine Lincoln's DNA."

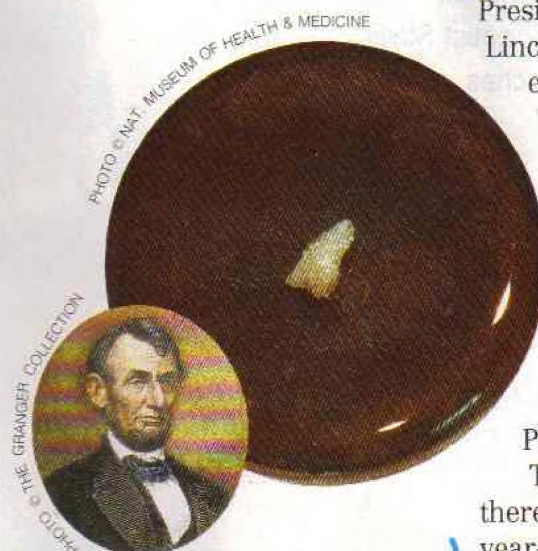


PHOTO © NAT. MUSEUM OF HEALTH & MEDICINE



PHOTO © THE GRANGER COLLECTION

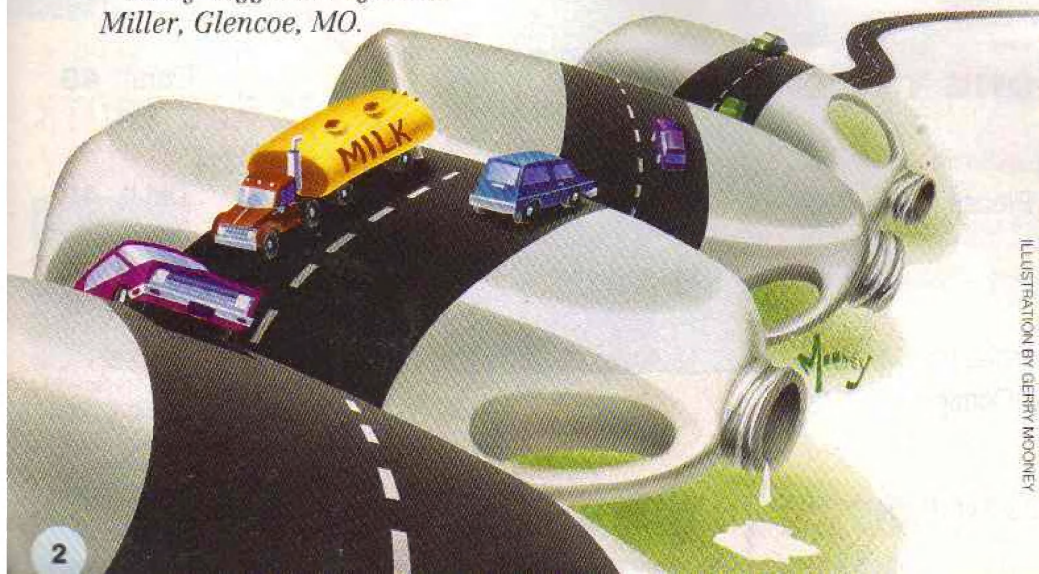


ILLUSTRATION BY GERRY MOONEY

See Spot Grow

Some stargazers have been seeing more than stars lately. They're seeing spots!

At least they have been since last September. That's when an amateur astronomer rediscovered a giant white spot on Saturn. A spot was first seen on Saturn in 1897, only to disappear a few weeks later. Since then, one has been spotted every 27 to 30 years.

But this time the "great white spot" has grown into a wide band that now stretches around the entire planet. Scientists don't know for sure why the spot has been growing, but they think it's caused by fierce storm clouds.

Saturn's stormy band looks very similar to the cloud bands that trail Jupiter's Great Red Spot. (The Great Red Spot is a storm system that's as big as the planet Earth.)

Because of this, scientists now wonder if Saturn is turning into another Jupiter.

Story suggested by Anna Mracek, St. Louis, MO.

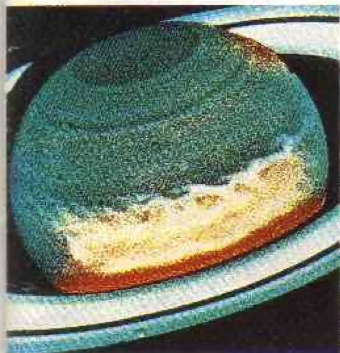


PHOTO COURTESY NASA



PHOTO © MOSAKU SAKURAI / UNIV. OF AGRICULTURE, TOKYO

Udderly Cool!

What's "moo"? Summer jackets and hats for cows! Not only do they beat the heat, but they look cool, too!

Mosaku Sakurai, an agriculture professor in Tokyo, says he has developed jackets with matching hats to help cows keep their cool in the summer. The three-piece outfit covers the head, back and stomach to shield cows from the sun and insects. And if the cows stay cool, Sakurai says, they produce more milk. That's why their hats and jackets are made for the shade!

Story suggested by Stephen and Andrew Ball, VA.

Noisemakers

Scientists have just discovered that the ocean makes lots of waves—sound waves, that is. The noise just beneath the surface of the sea is more than just babble: It's bubbles!

Underwater clouds of tiny, vibrating bubbles turn out to be the cause of all the noise. The bubble clouds are formed by breaking waves and by raindrops falling into the sea.

These bubbles are about the thickness of a human hair and don't collapse easily under water. Scientists say each bubble makes a high-pitched sound that lasts for a fraction of a second.

Why are scientists listening to the bubbles sound off? They think the sounds contain clues that will help them keep track of weather conditions, such as air temperature and rainfall over the ocean. Now that's what you call staying "tuned" for the weather!

PHOTO © STEVE WILKINGS/THE STOCK MARKET



So What's New?

You tell us and you'll get a nifty CONTACT T-shirt—if we print your story. Send us any science story from the news that you think our readers would like to know about. (Be sure to tell us your T-shirt size and where you heard the story.)

Send to:

TNT

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CONTEST ROUNDUP

GEOGRAPHY

The first-prize winner of our geography contest (January/February '91 issue) is Robert Fitch of Manhattan Beach, CA. He correctly identified our hidden country, FRANCE. The second-place winners were:

Chris Marshall, Fort Mills, SC
Desiree Kadlac, Whiting, NJ
Emilie Faynbits, Brooklyn, NY
Chris Purcell, Riner, VA
Erin Paul, Nevada City, CA

For those of you who had trouble identifying the other places, they were: Florida, California, Italy, Japan, Africa and Mexico.

ENDANGERED ANIMALS

The winning answers to our endangered animals Contest (April '91 issue) was BUFFALO and BALD EAGLE. The first-prize winner was Kelly Mitchell of Saginaw, MI. The second-place winners were:

Brenda Smelser, Monona, WI
Ann Franklin, Rocky Hill, CT
Ian Spinelli, Hilton, NY
Travis Feldhaus, Union, KY
Shannon Moreland, Broken Arrow, OK

Thanks to all of the thousands of readers who sent in entries to both of our contests!

WRITE NOW!

Dear CONTACT,

Your "Save Our Planet" special (April '91) really got me interested in working to save our environment. Now I hope to start a group to clean things up in my neighborhood. Do you know of any organizations that would help me get started?

Chris Durie
Rocky Hill, CT

We're glad to hear that you took our stories to heart, Chris. Here are a few groups that might be

able to help you out. Write to them and ask about their programs for kids. Try elsewhere, too. If you shop around, you'll discover many other great organizations that are working hard to save the planet.

Kids for Saving Earth

PO Box 47247
Plymouth, MN 55447

U.S. Environmental Directories

Box 65156
St Paul, MN 44165

The Environmental Defense Fund

1616 P Street NW, Suite 150
Washington, DC 20036

Renew America

1001 Connecticut Avenue NW
Suite 1719
Washington, DC 20036

Greenpeace

1436 U Street NW
Washington, DC 20009

Water Pollution Control Federation

601 Wythe Street
Alexandria, VA 22314-1194

WE WANT MAIL!

Dear Readers:

We love hearing from you. Your questions and ideas help us make CONTACT a better magazine. So why not drop us a line? We can't answer every letter, but we do read them all. Send your mail to:

3-2-1 CONTACT: Letters
P.O. Box 40
Vernon, NJ 07462



Lisa Frank® Products Make For Best Friends

The Lisa Frank® lifestyle includes doggies. The cute guy pictured here is a new member of the family. His name is Caymus, he's a Golden Retriever. Now Lisa has 2, the big guy (pictured below) is Casey.



Lisa Frank® packages friendship. All of her products are happy, colorful, and outrageously fun.

Lisa Frank makes your favorite designs and products, from stickers and stationery to activities and school accessories, party favors and so much more. They are like best friends, like our puppy (Caymus), he's so loveable and cute. So are Lisa Frank products, happy, colorful and so much fun, they make for best friends.

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ANY QUESTIONS?

By Christina Wilsdon

HOW

DOES POPCORN POP?

According to a Native American legend, the pop in popcorn came from a demon hidden inside. Whenever the corn was heated over a fire, the demon got mad. As the corn got hotter, he would blow his top. Pow! The popcorn exploded, and the tiny demon was gone!

But there isn't a "kernel" of truth to this legend! The real secret is water. Without water, your popcorn would just sit there, instead of popping all over the place. There is water in the center of every kernel of corn. It is hidden within a tiny blob of soft starch.

When you heat the corn, the water gets hot, too. Heat causes things to expand, or spread out. The heated water turns to steam. Pressure inside the kernel rises until it explodes and releases the steam.

All that's left is the blob of starch. It gets stretched as the kernel blows open. Soon it hardens with some air inside. And you've got a fluffy bit of popcorn. Now pass the salt!

Question sent in by Alpa Patel, Montpelier, VT.



HOW

LONG DO DREAMS LAST?

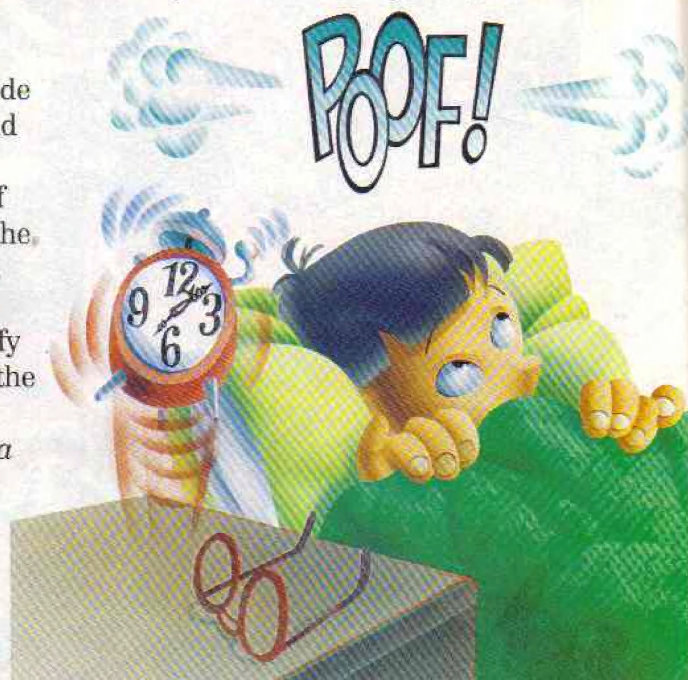
The idea that dreams only last a second or two was popular once. But scientists keep learning new things about sleep and dreaming. The latest "snooze" on dreams is this: They can last from five minutes to half an hour!

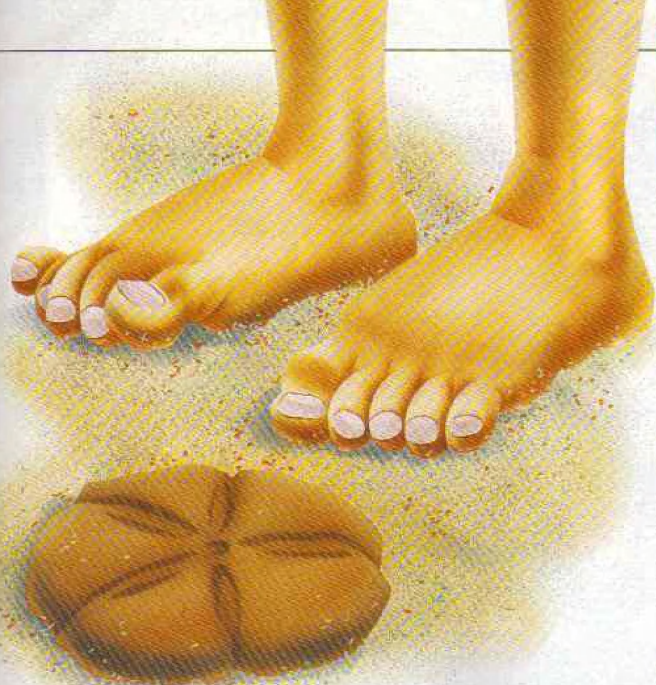
Scientists study dreaming by measuring the length of a person's electric brain waves. The brain is always sending out electric waves. A sleeping, non-dreaming brain puts out long, slow waves. The waves speed up and shorten when a person is dreaming.

Your eyes move quickly when you dream. Scientists can tell when you're dreaming because of this rapid eye movement. That's why they call it "Rapid Eye Movement" sleep (REM, for short). REM sleep is important because it helps you to feel well-rested. All night long, you drift in and out of different stages of sleep. You enter REM sleep about every 90 minutes.

The average person dreams about 300,000 dreams during his or her life. Sleep on that idea...and sweet dreams!

Question sent in by Carly Paul.





WHAT

IS A SAND DOLLAR?

A sand dollar is a sea creature that is related to sea urchins. It lives in the sand in shallow coastal waters. You might spot one in a tide pool, but most sand dollars are in deeper water, out past the surf.

A live sand dollar is round, flat and fuzzy. Some people call it a "sea biscuit" because it looks like a cookie! Its fuzz is made of hundreds of tiny spines. These spines help the sand dollar to crawl, dig and gather tiny bits of food. It also has many little tube-like feet all over its body.

You can often find the skeletons of sand dollars on the beach. They are gray, smooth and round. On top of the skeleton you can see holes that were used for breathing. The hole in the bottom was the creature's mouth.

The sand dollar is probably one of the only animals to be named after its skeleton. Whoever named it thought it looked like a silver dollar and "coined" its name!

Question sent in by Bryan Lebel, Lowell, MA.

WHY

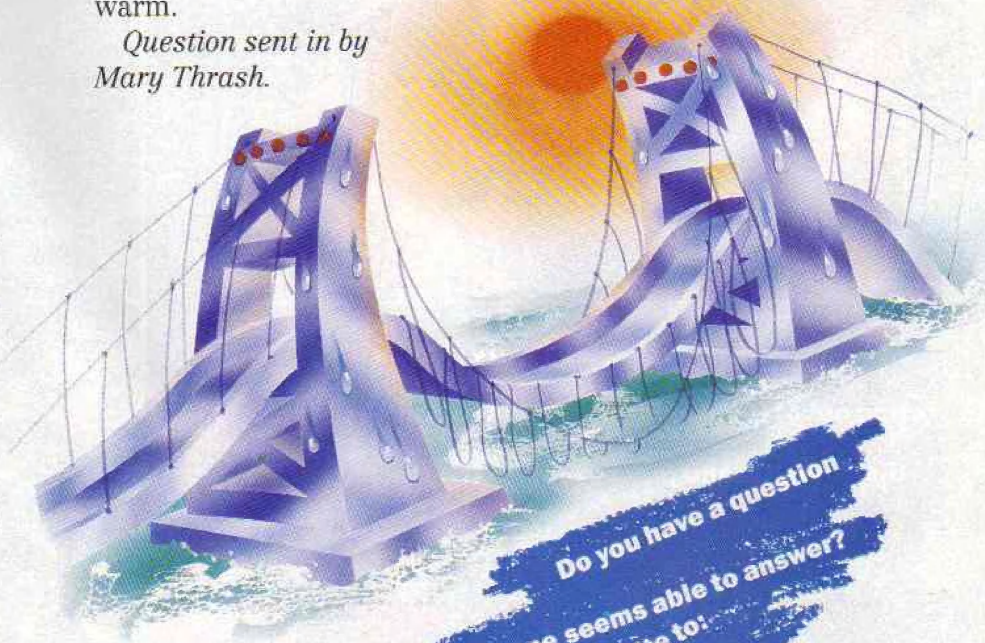
DOES METAL EXPAND UNDER HOT WATER OR IN HEAT?

It's not just metal. Almost all objects expand, or get bigger, when they heat up. All objects are made of molecules. A molecule is made up of a group of atoms that have joined together. When you heat an object, you shake the molecules inside it. Heat makes these molecules move faster. In order to move, they move apart from each other, so they take up more space. This makes the object expand.

Builders keep this fact in mind when they build bridges, buildings and roads. They leave room for metal (or concrete) to expand in hot weather and to shrink in cold weather. If they didn't, the structure would crack and break.

There's probably an example of expanding metal right in your home: the thermostat. Thermostats control the heat in your home. Inside a thermostat is a bar made of two strips of metal. One strip expands faster than the other. This makes the bar move when the strips heat up and cool down. The bar acts like an automatic electric switch—keeping your home toasty warm.

Question sent in by Mary Thrash.



Do you have a question
that no one seems able to answer?
Why not ask us? Write to:
Any Questions? 3-2-1
Contact, P.O. Box 40, Vernon,
NJ 07462

OCEAN B L

ARE WE KILLING OUR COR

By Elizabeth Vitton



PHOTO © STEPHEN FRINK/THE WATERHOUSE

In a burst of color, these flowery polyps pop out of their rocklike homes to capture tiny animals and plants that float by.

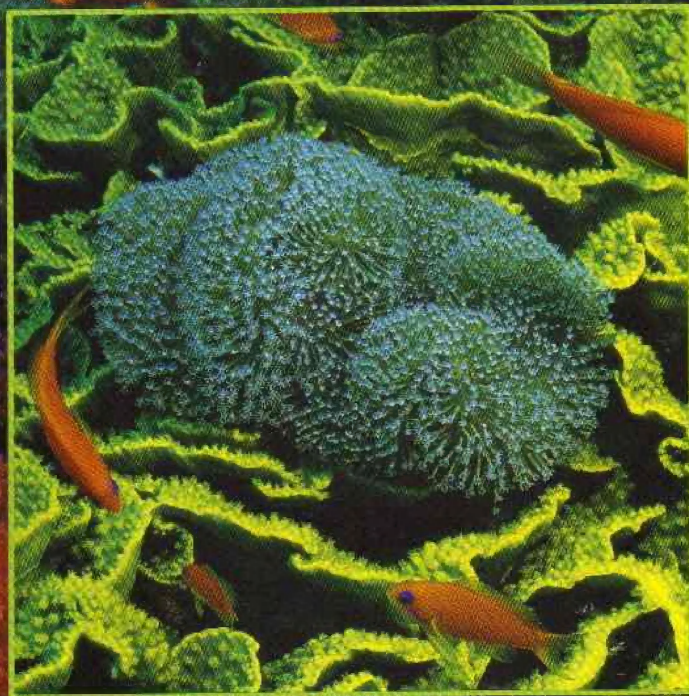


PHOTO © STEPHEN FRINK/THE WATERHOUSE

How does a coral garden grow? This healthy bed of lettuce coral thrives in the Red Sea.

U E S

AL REEFS?

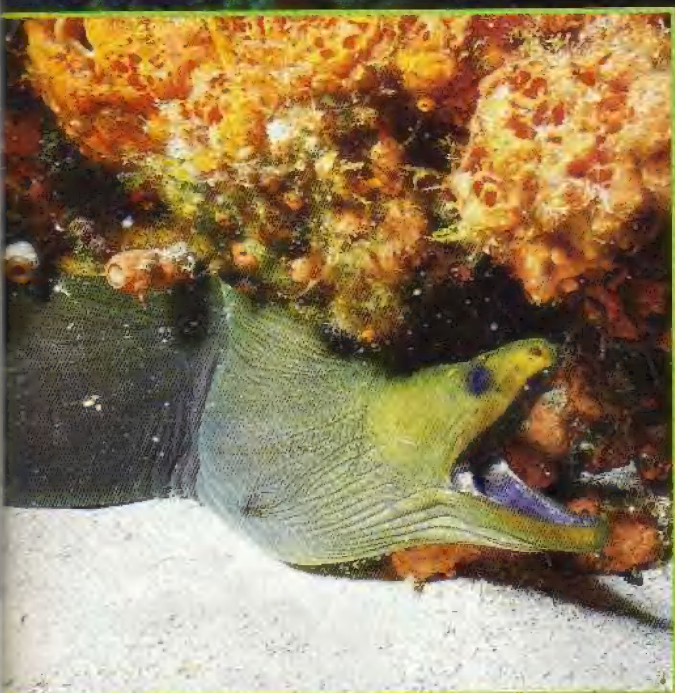


PHOTO © J. W. KIMBROUGH/PHOTO RESEARCHERS, INC.

Open wide! A green moray eel gapes
out from a lush forest of coral.

“I drifted down into the crystal clear waters of the barrier reef—an aquanaut weightless in the deep blue,” says Jacque Carter, a coral reef expert. “Swarms of fish appeared as if by magic from among forests of branching corals: drifting clouds of brilliant blue and yellow. Schools of parrotfish crunched coral with their beaklike jaws. Below me, a pipefish stood on its nose, trying to hide itself among waving blades of sea grass.”

“A giant boulder of brain coral guards the entrance to a small underwater cave. I entered and was greeted by the toothy grins of green moray eels. They were stretching their rubbery necks toward me as though I were some kind of underwater snake charmer. No matter how often I dive, there’s always something different to see.”

Magical sights such as these, however, may quickly disappear if nothing is done to save coral reefs. Reefs around the world are suffering heavy damage from both humans and nature. “We’re now facing a major problem, where many reef systems are being turned into wastelands,” Jacque Carter told CONTACT. He’s a research scientist at Wildlife Conservation International.

Underwater Rain Forests

Carter is just one of many scientists who believes that this means bad news for the future of the oceans. Coral reefs are home to about one million species—including 2,000 different types of fish. “A huge number of marine plants and animals depend on the reefs for their survival,” explains Dr. Rodney Fujita, a marine scientist. “Coral reefs are the tropical rain forests of the oceans.”

Like rain forests, coral reefs grow in the tropics. They are found in shallow, clear tropical waters that are 68 degrees Fahrenheit or warmer. “Coral reefs are the largest biological structures in the world,” Dr. Fujita told CONTACT. “You can see them from outer space!” The biggest, the Great Barrier Reef off the coast of Australia, is more than 1,200 miles long.

These huge coral reefs look rock hard and dead—but they’re actually alive! Corals are made up of millions of tiny living creatures called polyps (say: POL-ups). Each coral polyp is about the size of a pencil eraser. It has a soft body, a stomach and a mouth that is surrounded by tentacles. The polyps use the tentacles to capture food as it floats by. Polyps stay inside their stony capsules during the day, Dr. Fujita says, “but at night their tentacles pop out, making the coral look fuzzy.”

Polyps live close together in colonies. To build

PHOTO © TERRY H. FRANKLIN/THE WATERHOUSE

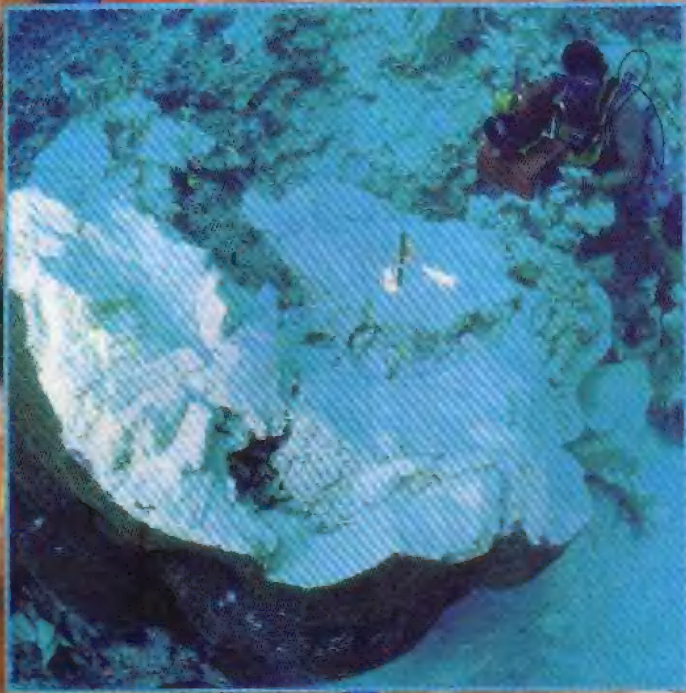


PHOTO © ROBERT HOLLAND/THE WATERPULSE

When a freighter ran aground, it bulldozed through this head coral and caused acres of damage.

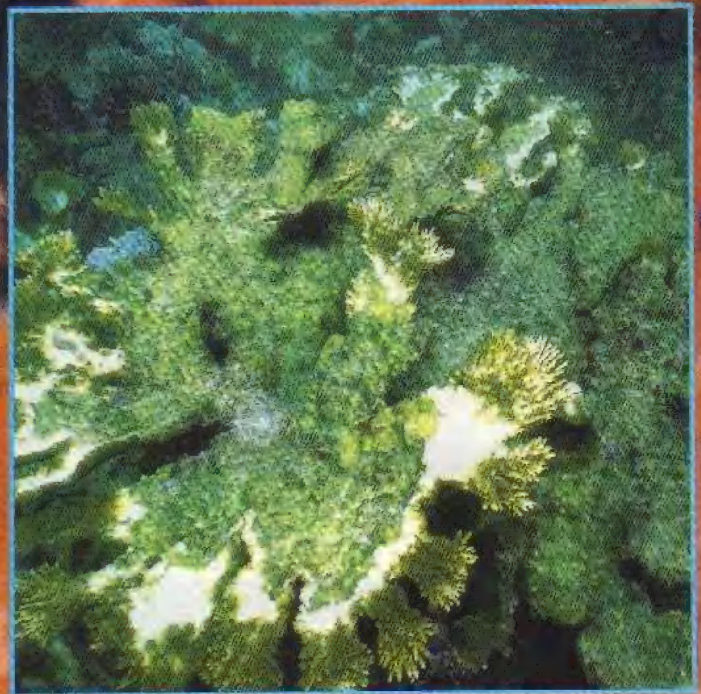
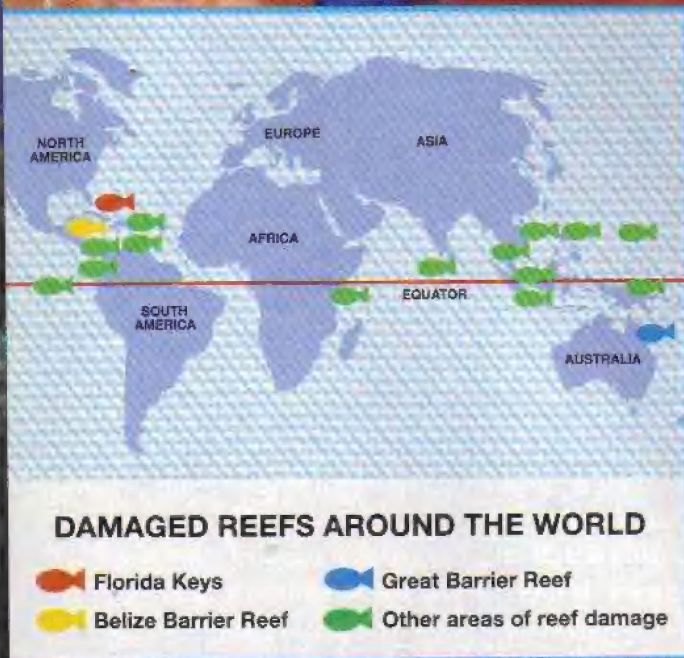


PHOTO © SCOTT G. WALL/STILLWATER/QUICK

This elkhorn coral is dying. Water pollution causes algae to smother the corals.



homes, corals ooze limestone around their polyps. "A coral reef is actually the limestone skeleton made by billions of coral polyps over thousands of years," notes Dr. Fujita. As polyps slowly grow up toward the light, they build new skeletons on top of the old ones. "Corals have growth rings just like trees do. So you can find out how old a coral is by looking at its rings."

Corals are part animal, part plant. Thousands of microscopic plants live inside each polyp. These plants are called zooanthallae (say: ZOH-an-tha-lay). "Zooanthallae make oxygen for the polyps and eat some of the coral's waste products," Dr. Fujita explains. "And in return, polyps protect the zooanthallae." Zooanthallae also add a lot of color. In fact, most of a coral's color comes from these plants growing inside of it!

A Sea of Troubles

Lately, though, miles and miles of coral reefs have been turning ghostly pale. "Since 1987, there has been a huge amount of bleaching throughout the Caribbean and Florida Keys," marine scientist Dr. Brian Lapointe told CONTACT. "Corals are extremely sensitive. When stressed, they get rid of their zooanthallae. This causes the corals to bleach, or turn snow white, since it's the plants that give corals their color."

What is causing the bleaching? "We now think it's caused when water temperatures rise too high," answers Dr. Lapointe. "In the tropics, seawater temperatures only change a few degrees. Coral reef animals can only live within a narrow range. If temperatures rise above the limit that corals can stand, there will be bleaching." When temperatures remain high, the corals not only lose their zooanthallae, they die.

Some scientists think that worldwide coral bleaching may be an early sign of global warming. "It might be one of the first warnings that temperatures are rising," Dr. Fujita argues. "Some coral bleaching is common. But many corals worldwide have bleached three out of the last four years. It's like all the rain forests catching fire at the same time!"

Reefs face other problems, too. "A lot of damage happens when corals are damaged by freighters," DeeVon Quirolo told CONTACT. She helped start Reef Relief, an environmental group in Key West, FL. "Last year, three freighters ran aground. This turned acres of coral into flat parking lots."

Freighters aren't the only boats that cause damage. Pleasure boats, some carrying up to 200

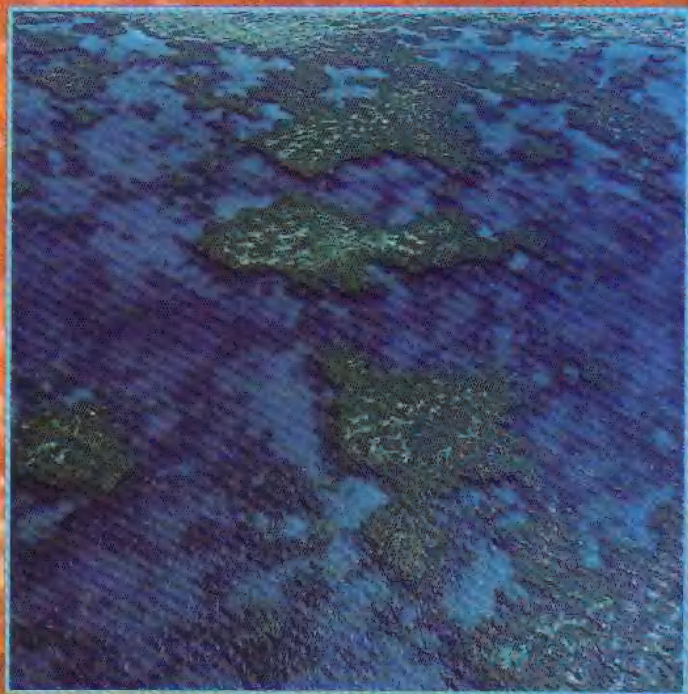


PHOTO © STEPHEN FRANK THE WATERHOUSE

Australia's Great Barrier Reef is the largest reef system in the world.



Inside a coral's tentacles are thousands of tiny *Zooxanthellae*.

PHOTO © PETER PARKS

divers, cast their anchors into the water and knock off coral. Some divers on these boats break off pieces of coral that may have taken a century to grow. Lots of divers bump, scrape and step on the coral, too, Quirolo says. "The slightest contact from a dive tank or swim fin can scar a section of coral.

"People also pollute the water with plastic foam cups, aluminum cans, plastic bags and bottles," adds Quirolo. "The problem is so bad, we've put up signs saying, 'Don't teach your trash to swim!'"

Anchors, flippers and trash aren't the only things threatening coral reefs, however. "Corals need clear, clean water," Dr. Lapointe says. But soil washed into the sea from farms and from rain forests that have been cut destroys the water quality. The dirt blocks the sunlight, which polyps need to grow. Sewage and agricultural chemicals that flow into the ocean also cloud the waters. This pollution causes algae to grow too quickly. And the algae smother the corals.

The corals are under attack by fishermen, too. "Every day, thousands of pounds of reef fish are caught with traps," explains Jacque Carter. "In the Pacific, some fishermen use dynamite and poison to chase the fish out of the reefs and corral them. It's like setting a field on fire." The dynamite destroys chunks of reef. And even though the poison is only supposed to stun the fish, it often kills them—and the corals.

To make matters worse, coral harvesting for aquariums has wiped out 20 out of 110 types of coral in the South China Sea. And mining too much limestone from the reefs for building materials is also causing heavy damage worldwide.

Global Treasure

Corals can hold up under a lot of stress, Dr. Fujita says, "but we're beating our corals to death." And it's time to stop. Coral reefs are not only beautiful, they are valuable. The reefs protect tropical shorelines from erosion. (Without a protective wall of reef in front of it, the shore would wash away very quickly.)

And just as life-saving drugs have come from tropical rain forests, many drugs are being made from chemicals found in the reefs. Some of these new drugs are helping treat arthritis, cancer and heart disease, notes Dr. Fujita.

What is being done to save the "rain forests of the ocean"? Conservation organizations are buying land near the reefs and turning them into parks to help protect marine life. "Wildlife Conservation International is helping save the reef system off Belize—a nation in Central America," Jacque Carter says.

Many environmental groups in the Florida Keys are working to protect the last living reef system there. Last December, Congress passed a law making the entire Florida reef a safe place for marine life. This sanctuary is off limits to freighters.

Local groups are trying to help, too. People living in the Keys are starting a sewage recycling system to prevent sewage from seeping into the reefs. And thanks to Reef Relief, some polluting detergents can no longer be used in the Keys. "We've also got a three-year drilling ban," DeeVon Quirolo adds. "This means no offshore oil drilling near the reefs." Says Quirolo, "We're trying to make a difference." ♦

RELIEF FOR REEFS

Be a sea fan.

Support and write to conservation groups that work to save coral reefs.

For more information about corals, write to:

**Friends of the Coral Reef
Center for Marine Conservation
1725 Desales Street N.W.
Washington, D.C. 20036**



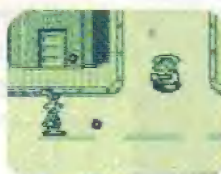
Mouse around the house.

Or, hop until you drop.



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the flying squirrels
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pop up out of manholes
when you least expect it.*

Now Roger's got problems too. Jessica, his toonstar wife, has been kidnapped. To save her and all of Toontown, he must defeat Judge Doom and his five henchweasels. So save the cheese for later. Make like a rabbit. And get both games now.

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SPLISH

RIDING WAIMEA

Surfed on a seven-foot wave lately? Floated down a river on a raft? Zoomed down a 60-foot-high water slide at 40 miles an hour?

Believe it or not, there are new rides at water parks around the U.S. that make incredible stunts like these easy! Designers of water rides are using science, math and the latest in computer technology to give kids and adults bigger thrills and spills than ever.

Roller coaster fans who like the water would love Waimea, at Raging Waters Park in Salt Lake City, UT. Waimea is the world's first water ride to have a hill, carrying riders up and over a

curve in a state of near-weightlessness.

You don't ride this roller coaster in a car, though. Instead you sit or lie flat as you zoom up and down through jet streams and sprays.

At one point you drop 50 feet straight down—head first! Then you swoosh up a hill towards the sky. At the top of the hill, you travel several inches off the ground. When you land, you slide down again, and into a pool. As you hit the water, you're still going about 25 miles an hour, so you skim all the way from one end of the pool to the other.

It only takes 15 seconds to ride Waimea, but it took Fred Langford of the Surf Coaster Corporation five years to design it. He had to decide on the shape of the ride, make sure it was safe and figure out just where each curve should be.

Langford also had to figure out how much friction bathing suits would create. Depending upon

The angle of the slide ensures that the rider will land gently at the bottom. For about 25 feet of this part of the trip, the rider is slightly airborne.

the suit's material and fit—cotton or nylon, baggy or tight—a rider could go too slow or too fast. Langford had to make sure riders would go at just the right speed or they'd bump into other people on the way down!

Though most of the calculations were done on a computer, Fred solved many of his problems by trial and error, and by testing the ride himself. Its hilly shape was chosen so that, "once somebody

Get in a tube and float down some human-made rapids in this water ride.

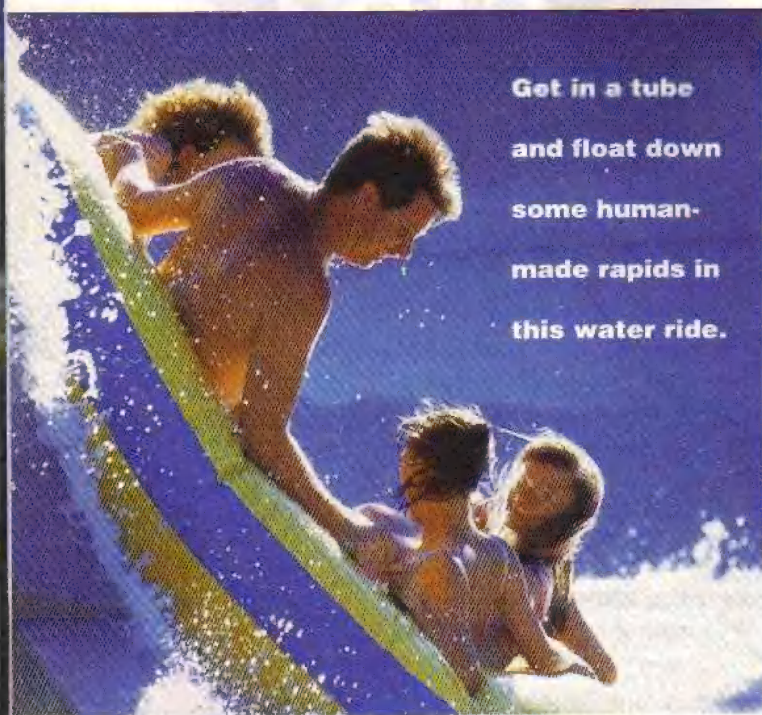


PHOTO COURTESY RUSHING RIVER

SPLASH

By Billy Aronson

WATER RIDE DESIGNERS ARE MAKING WAVES

As the rider moves up the hill, she sees only the sky. This adds to the scariness.


When the rider reaches the bottom of the slide, she is going at about 40 miles per hour. The speed carries her up the next hill.

On the final crest, the rider is one to six inches off the ground--in a state of near-weightlessness.

becomes airborne, which they do, they just ride over the surface of each arch, anywhere from one to six inches high, and then go down gently on the curve," Langford explains. "It's almost like you're in orbit."

Was all the work worth it? Brian Brody, 13, of Salt Lake City told CONTACT: "Going down that slide is the best thing in the world. It's unbelievable. You look down and the crowd is going 'oooo! incredible!'"

Rollin' Down the River

If the idea of speeding down a slide alone makes you a little nervous, you'd probably prefer Rushing River, a popular new ride at Waterworks at Kings Island, in Cincinnati, OH. Since this gigantic water slide is eight feet wide, you can ride the whole way down with four other thrill seekers. 

The rider travels down the final hill at 40 miles per hour. At the end of Waimea is a "braking area" and a pool where the rider makes a gentle landing.

ILLUSTRATION BY ROBERT BURGER

The group gets in a rubber raft at the top of a steep mountain, then slides 750 feet along a curving human-made stream. Rushing River cuts through a grassy hillside and down into a deep ravine, where breathless riders end in a pool.

According to designer Rick Hunter of Proslide Technology in Quebec, Canada, it took extra planning to design a slide for

group riding. All the angles had to be especially smooth so people wouldn't bump against each other. The raft had to be able to pick up enough speed to thrill riders, without making them uncomfortable.

The folks at Proslide were able to solve these problems using computers. "With the new technology, we can calculate velocities [speeds] and curves bet-

ter than ever before," Rick explains. "We can also generate designs in 3-D, to get a better picture of what the slide will be like. This helps us figure out how to make a ride that's exciting and also safe."

Making Waves

The moon creates the tides that make waves rise and fall in the ocean. But a ride at Typhoon Lagoon in Orlando, FL, outdoes the moon in producing waves. Typhoon Lagoon has an amazing computer-operated wave machine that sends waves of all sizes and shapes bouncing across the pool.

Twelve chambers along the back of the pool pump air down to get the wave started. By making the chambers pump at different times, the computer can create a wave that's diagonal, like in the ocean, or diamond-shaped, or in any of six other shapes!

Another wave machine on the side can pump in a burst of water, instead of air, to send a tall wave rolling straight across the pool. Waves of this type are called surfing waves, since they're great for body surfing. The surfing waves at Typhoon Lagoon reach as high as nine feet. And there's no undertow to trip you up.

According to Chris McKenzie, 11, "The waves are better than in the ocean because there's no salt water and it's not as cold."

Whether you like being scared, thrilled, spilled, spun or bounced, there's a water ride for you. Chances are, the next generation of water rides will make an even bigger splash for eager fans who want to soak up some excitement and fun. ♦

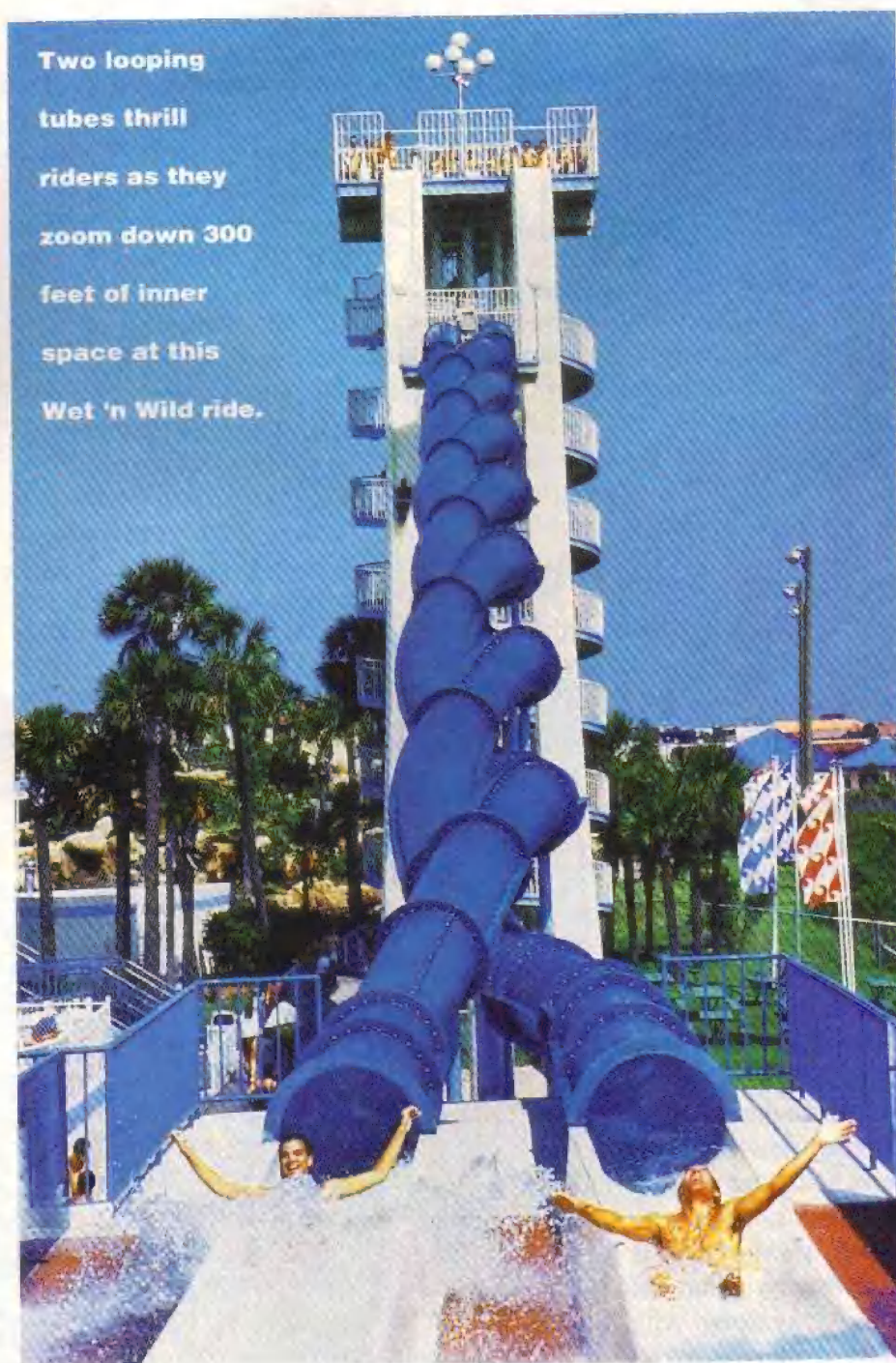


PHOTO COURTESY WET 'N WILD



If you're up for adventure, look under the sea.



If Ariel doesn't make it through the shipwreck, she's sunk.



You have to snare the crabs, before you can outbubble the eels.



You can tell big Ursula has a lot of practice on the fish toss.

If *The Little Mermaid* was your most favorite movie of all time, you'll love this video game. Flounder, Sebastian and Prince Eric are all there. But unfortunately, so are Ursula and her evil creatures. Sing along with "Under the Sea," as you help Ariel win the prince and save her friends. It's an adventure you'll have to sea to believe.

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Trinidad canopy cockroach

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American cockroach

PHOTO © BETTY FABER



An exotic Trinidad roach

PHOTO © BETTY FABER



Trinidad cave cockroach

BUG PATROL

A SCIENTIST STALKS ROACHES

By Eric Weiner

At the Museum of Natural History in New York City, everything is quiet. Huge dinosaur models loom in the darkness. It's three o'clock in the morning. All the visitors have long since gone home.

All except one, that is. In the museum's fifth-floor greenhouse, Betty Faber is hard at work.

The short, round-faced woman beams her infrared flashlight around the pitch-black room. Suddenly, she sees something. She picks up a tape recorder and reports, "Roach Number 191, female, headed towards a centipede!"

The tiny centipede wiggles its back legs. It seems to be copying a standard roach greeting. Confused, roach 191 pauses for a moment. Then the centipede pounces, and a battle begins.

"Finally, the cockroach manages to shrug the centipede off and lumbers away," Faber reports. "Nobody was fatally injured."

Roach Fans

Betty Faber is one of the world's top experts on roach behavior. (She currently teaches entomology—the study of insects—at Rutgers University in New Jersey.) In her last experiment, she studied a group of 2,000 roaches. (To tell them apart, she glued name labels on the bugs')

backs.) She used her tape recorder to keep track of every move the roaches made, from scurrying to wriggling. She watched night after night—for 10 long years.

Why does she want to study what others want to smush? Faber finds these creatures fascinating. For instance, she is one of the few people who has ever witnessed the male roach's courtship dance.

"It consists," she says, "of a lot of wing flapping, running around and backing into things."

Scientists like Faber love to stalk through hot dangerous jungles looking for new roach species. So far, bug experts have identified 3,500 different kinds. They think there may be thousands more.

Scientists have found roaches of every size, shape and color. There's a green banana roach. A blue roach with white strips and big red eyes. And a four-inch-long Madagascar roach, which hisses. Faber keeps one of these at home as a pet.

She goes to Trinidad—an island-nation in the Caribbean Sea—as often as she can, bringing back whole bags full of bugs. "I put them in a shopping bag with a silk scarf on top, so I don't frighten the other passengers!"

Only a few kinds of cockroaches can survive for long outside of the jungle. But these hardy roaches have spread all over the world.

The German cockroach, for instance, can squeeze into teensy cracks one-sixteenth of an inch wide. That has helped it to stow away on ships, submarines and planes.

"I'll bet there were some cockroaches who came to America on the *May-*

flower," laughs Faber.

The kinds of roaches one meets in the U.S. can survive anywhere except the North or South Pole. They can be frozen for 48 hours at a stretch and still be fine—once they're thawed out. They can last a whole month without food.

But it's rare that a roach needs to go without eating. The bugs aren't picky. They'll eat anything, including wallpaper, glue and soap.

Still, says Faber, a healthful diet is important for roaches. She feeds her pet Madagascar only bits of apples and grains. 🐜



Betty Faber likes to study her roach subjects up close.

PHOTO © JASON TEELE

"Too many potato chips is bad for them, just like it is for humans. They get fat. The white gooey stuff that comes out when you step on them? That's fat."

Amazing Survivors

Think about it. Humans spend about \$150 million each year, trying to rid their homes of these tiny brown pests. But still the cockroaches are thriving.

A few years ago, miners in Illinois dug up a roach fossil. Roach expert Dr. Frank Carpenter studied the rock. He estimates that the fossilized roach is 300 million years old!

"Cockroaches have survived dinosaurs, ice ages and who knows what since they first appeared," says Dr. Carpenter. "Astonishingly, there's almost no difference in form between ancient cockroaches and those in our homes. They're the only insects to have lasted so long with so little change."

Have you ever tried to step on a roach? Tiny sensitive hairs on the bug's legs react to the slightest breezes. As you move, you rustle up air currents. The roach will be off and running in less than a tenth of a second. That's faster than you can blink your eye!

Clean as a Cat

Most people think of roaches as filthy. The fact is, they do carry germs. Even Betty Faber recommends squashing them when they get into your kitchen. But she has found that roaches clean themselves as carefully as a cat.

Over and over, the roach wets its legs in its mouth and runs them over its back, preening and grooming. When its back is particularly dirty, the cockroach will back up against something and try to scrape off the muck.



PHOTO © JASON TEELE

Tagging and measuring

roaches and watching

their behavior keeps

Betty Faber busy.

Betty Faber uses an

exercise wheel to

study the movements

of roaches.



PHOTO © JASON TEELE

Dr. Faber says that the Trinidad cockroach smells like cinnamon. It is often found in the thatched roofs of houses.

Maybe you're thinking: "I don't care how often they clean themselves, they're still disgusting." Well, you're not alone. Faber used to be scared herself.

"I grew up in Biloxi, Mississippi, where there are plenty of big roaches. You'd be at a high school dance when a roach would scurry across the floor. Everyone would scream and I'd scream along with everyone else."

For a science experiment in graduate school, Faber had to learn to pick up roaches with her bare hands. "I had never touched a roach before. At first, it was awful." But she soon learned to overcome her fear.

Roach Ranch

Back in her office, Betty Faber is about to pick up a live roach. First, she rolls up her right

For some people, having a roach crawl over their finger is a nightmare. For Betty Faber, it's all in a day's work.



PHOTO © BETTY FABER



sleeve. "Otherwise it might scramble up my shirt," she explains.

Now she reaches her hand into the plastic case filled with dark brown squirming cockroaches.

"The best way to pick up a roach is to hold it gently but firmly between the legs. It won't bite. It may try to nibble on your fingernails. But a roach's mouth can't open wide enough to bite.

"Don't pick up a dead roach," Faber warns. The roach probably died from pesticides. The poison could get on your hands.

Holding the roach, she points out that it has two extra feelers in back. That means it's a male.

"Oops!" says Faber, daubing at the roach with a Kleenex. "You should always have a tissue on hand," she explains. "They poop when you pick them up. They also put out a smelly warning fluid." This is a roach's way of convincing other animals not to eat it.

Just then, the roach gets loose, zigzagging across Faber's carpet at a high speed. She falls to the floor and snares it. "Gotcha!" Faber cries. She holds up the roach and laughs: "Fun and games at the roach ranch!"

To people who hate bugs, Betty Faber's enthusiasm may appear a little odd. She doesn't mind that at all. She finds bug-watching has its own rewards.

"I don't need to go to Mars to see weird, thrilling, alien creatures." Betty Faber waves her hand at the tub of roaches on her desk. "They're right here." ♦

PHOTO © JASON TELE

FACT



There are about 1.2 billion cattle in the world.

More than half the weight of a stick of gum is sugar—about one-half teaspoon of it is in each stick.



ILLUSTRATIONS BY CHARLES PEALE

You have about 200 eyelashes per eye.



This is the 716th Factoid printed in CONTACT.

Olds

▶ **F**ingernails grow faster in a warm climate than in a cold climate.



▶ **T**he world's longest staircase is in Switzerland. It has 11,674 steps.



▶ **T**ermite queens live longer than any other insects. Some survive for more than 50 years.



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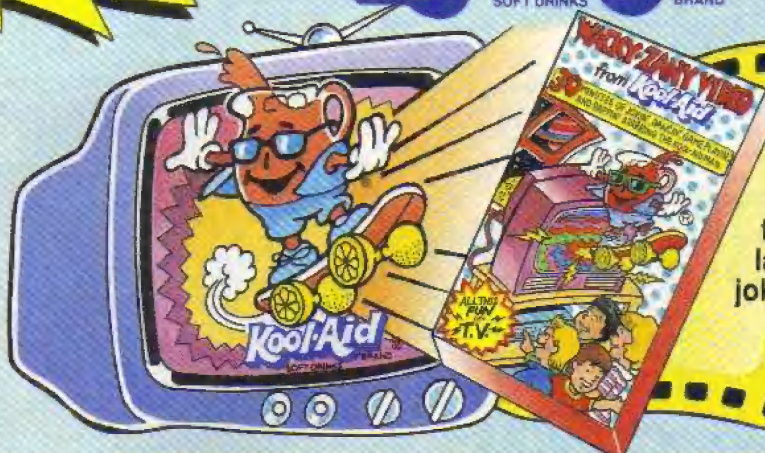
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STAR TOWER

A SAFE ECLIPSE-WATCHING PROJECT

On July 11, 1991, the moon will pass directly between the sun and the Earth. It will be the 20th century's last great total eclipse of the sun.

For up to seven minutes (depending on where you live), the moon will appear to completely cover the sun. In some places in the U.S., especially Hawaii and the West Coast, the sky will get so dark that stars will become visible. Don't miss out, an eclipse like this won't happen again for more than 100 years!

But wait! *It's very dangerous to look directly at the sun.* You can do permanent damage to your eyesight. So build this sun-spotting Star Tower, and catch the eclipse while it's going... going... gone!



ILLUSTRATIONS BY JOLYNN ALICORN

What You'll Need

- A tall cardboard box (Any size works, but two feet tall and one foot wide is best.)
- Some aluminum foil
- Tape
- Scissors

How To Build It

1. Using the tip of your scissors, make a tiny hole in the center of a large piece of tin foil.
2. Cut a one-inch circle on the top of the box. Cut a one-inch by four-inch slit at the bottom of one side (see drawing).
3. Tape the tin foil over the top of the box so that the two holes line up.

How To Use It

Now you have a safe way to watch a solar eclipse. Aim the top of your tower at the sun and look through the slit at the bottom. The sun's image will appear on the inside of the box.

Warning: Never look directly through your tower at the sun. Look at its image on the inside of the box.



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Do you flip over Frisbees?
Join the crowd! True, the Frisbee is just a round piece
of plastic. But there's more to it than meets the eye. We
went to the experts and found out some cool stuff about
this seemingly simple toy. So here's everything you
ever wanted to know about flying discs—
but were having too much fun
throwing them to ask!

TOSSED SPACE

ALL ABOUT FRISBEES AND OTHER FLYING DISCS

By Mark Danna



PHOTO COURTESY WHAMO

Q: WHAT'S THE DIFFERENCE BETWEEN A FRISBEE AND A FLYING DISC?

A: Not much. There are all kinds of flying discs: some whistle when thrown, others glow in the dark. One even changes in sunlight from clear to violet. The biggest is the size of a garbage-can lid. The smallest is about the size of a big bottlecap. At one time, there were even vanilla- and chocolate-scented discs for dogs!

But not all of these discs are Frisbees. Frisbee is the brand name of certain flying discs (the way Kleenex is the brand name of certain tissues). There are other brands of flying discs. But since Frisbees were first, most people just use the word Frisbee.

Q: WHO INVENTED THE FLYING DISC?

A: It wasn't Benjamin Franklin or Thomas Edison or Mr. Frisbee. Actually, two men, working separately, invented it at the same time. Although living on opposite coasts, Bill Robes and Fred Morrison had a lot in common. As kids, both enjoyed tossing the lids from coffee and paint cans. They were both carpenters, their dads were inventors and both loved flying things. Fred flew airplanes, Bill was one of the first skijumpers to do acrobatic tricks.

In New Hampshire, Robes

PHOTO COURTESY WHAMO





used a cherry-can lid as his model for the flying disc. He called it the Space Saucer and sold it to college students.

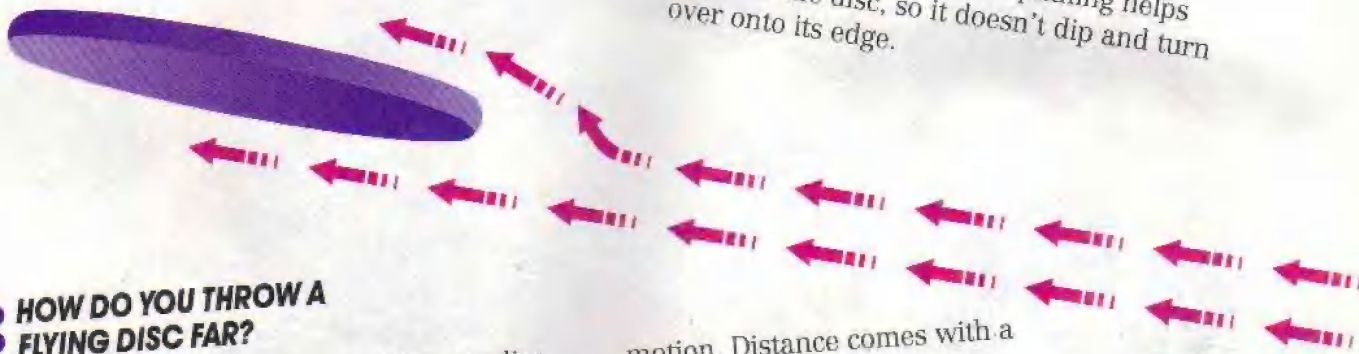
In California, Morrison came up with his own flying disc. Wanting to make it sound like a UFO, he called his disc the Pluto Platter. He sold it at beaches and state fairs.

Robes never sold his idea to a company, but Morrison did. In 1957, a company called Wham-O began selling Pluto Platters. Soon they renamed it the Flying Saucer. Then, as legend has it, Wham-O heard an unusual story. Many years before, the story went, the students at Yale University loved to toss pie tins that came from a nearby bakery. The name of the bakery was the Frisbie Pie Company. When someone made a bad throw, people yelled "Frisbie!" Wham-O liked the story and after changing the spelling, named their disc the Frisbee.

Q: WHY DOES A FLYING DISC FLY?

A: Dave Dunipace is the president of a company that makes flying discs. And he's also a former world distance champion. He explained to CONTACT why Frisbees soar: "Flying discs are very similar to an airplane wing. The top of the disc is curved, and the bottom is flat. Air travels faster over the top surface of the disc than under the bottom surface. So, a low pressure zone is created on top. This forces the air below to push up. And when it does that, the disc goes up, too."

Other forces affect the flight of the Frisbee. The rim of the Frisbee allows throwers to spin the disc. Spinning helps stabilize the disc, so it doesn't dip and turn over onto its edge.



Q: HOW DO YOU THROW A FLYING DISC FAR?

A: Peter Albers, who won a world flying disc championship last year, gives some advice on distance throwing. His winning toss in the finals was 417 feet, seven inches.

"You don't need to be big and strong to throw far. Coordination and timing are more important," Peter, 15, from San Diego, CA, told CONTACT. "Don't think of throwing hard. It's not a violent

motion. Distance comes with a smooth turning of the upper body, twisting the hips and a quick wrist snap."

Most distance throwers use a power grip. They make a fist with their hand, clamping all four fingers under the rim, and placing their thumb on top.

Three years ago, Sam Ferrans, then 19, set the world distance record. His disc soared 623 feet—more than the length of two football fields!

If you think that's far, listen to this. An Aerobie ring is a flying disc with a hole in the center and a thin rim. Because of this design, it sails farther than a Frisbee. Much farther. Several years ago, Scott Zimmerman threw the ring 1,256 feet!



PHOTO COURTESY WHAM-O



If you want to enter a local Juniors contest, contact:
Wham-O Promotion
Amy Berard
P.O. Box 4
835 E. El Monte Street
San Gabriel,
California
91778.





Q: HOW DO YOU THROW A FLYING DISC ACCURATELY?

A: Dani Chang, a 14-year-old from Kent, Washington, and the 1990 girl's Junior Champ, answers: "Put your index finger on the outer rim, your thumb on top and your other fingers underneath. If you're right-handed, stand sideways with your right side towards your target. Keep your knees slightly bent. Curl your wrist back and bring your arm across your body like a tennis backhand. Then shift your weight onto your front foot and snap your wrist."

"When you snap, make sure you point where you want the disc to go. Whatever you do, don't turn your hand over. If you rotate your wrist, the disc will turn over fast and roll away."

(Left) A freestyle contestant. (Right) Sinking a putt in Disc Golf. (Below) Players stretch for a pass in Ultimate Frisbee.



PHOTO COURTESY WHAMCO

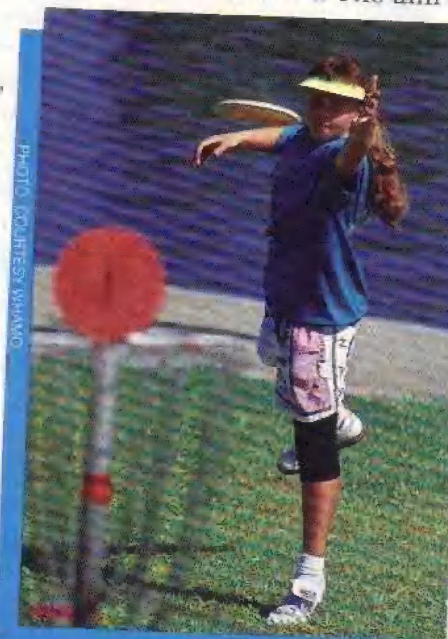


PHOTO COURTESY WHAMCO

Q: WHAT GAMES CAN YOU PLAY WITH A FLYING DISC?

A: One popular game is Ultimate Frisbee. This sport combines soccer and basketball. The object is for teammates to flip the disc to each other—while making sure the other team doesn't intercept it—until one of them reaches the end zone.

In Disc Golf, players try to complete an 18-hole course in the fewest throws. The "holes" are actually metal baskets. To sink a "putt," you have to throw the disc into the basket. There are 300 free public Disc Golf courses in the U.S.

There are also many full-scale disc competitions. Among the events are distance throwing; Freestyle, in which players show off their best trick throws and catches; and Maximum Time Aloft. The aim of that event is to throw the disc in the air and catch it yourself. The person whose disc stays in the air longest, wins.

Every summer, all over the country, there are disc championships for adults, Catch and Fetch contests for dogs, and local Juniors contests for kids 15 and under. ♦



PHOTO © KARL COOK

REVIEWS



BOOKS

You Be The Detective

by Marvin Miller
Scholastic, \$2.50

Some nasty crimes have taken place, and it's up to you to put together the clues. And we really mean put together the clues! Each mini-mystery's solution has been scrambled like a jigsaw puzzle. To get at the answers, you'll have to cut out the pieces and arrange them so that the solution becomes clear.

The Case of the Edible Evidence was our favorite, but we think you'll enjoy closing the book on all seven capers.

—Russell Ginns

Monsters

by Melvin Berger
Avon Books, \$2.95

Dinosaurs! Abominable snowmen! Glyptodonts! They're on the loose once more in this little book about big beasts. Brush up on your Tyrannosaurus trivia, and maybe even learn about some creatures you've never heard of before. It's fast, fun reading.

—R.G.

The Gem Hunter's Kit

by Tim Lutz
Running Press, \$14.95

Here's a nifty kit to get you started on the hobby of gem collecting. It comes with a set of eight real gems sealed in a soft block of stone. It's up to you to dig them out. There's also a book about how gems are formed, and why some are valuable—and some aren't. It's a great way to start learning about one kind of buried treasure.

—Rhetta Aleong



The Sneaky Square

by Richard Sharp
and Seymour Metzner
Tab Books, \$8.95

This book contains over 100 different math and logic puzzles for you to ponder. Some are simple brain teasers that you'll figure out quickly. But there are some that you'll probably never be able to figure out (until you peek at the answers). *Sneaky Square* is a must for "Square One" fans and math puzzlers everywhere.

—R.A.

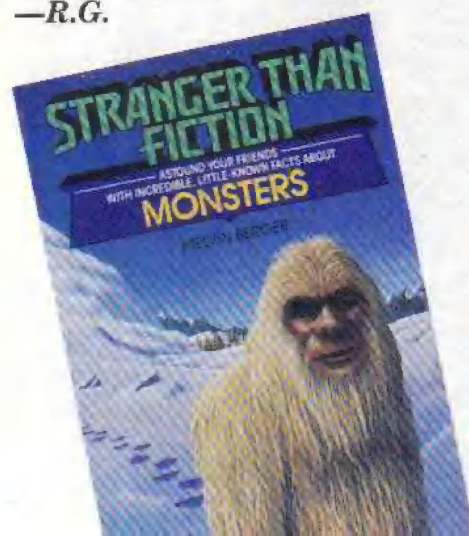
SOFTWARE

Chip's Challenge

for Atari Lynx
Atari, \$24.95

Guide Chip, the hero of this story, through 144 different puzzles! To solve each one, you'll have to move over water traps, collect keys, move blocks and avoid monsters—all in the right order. It's a lot of brain-teasing fun. And if you can make it all the way to the end, well, then you're certainly more clever than we are!

—R.G.



AN ADVENTURE WITH ARIEL IS IN YOUR HANDS.



Make a happy ending happen in this great game starring one of your favorite characters.

Go under the sea to help Ariel dodge the pesky eels, Flotsam and Jetsam, while picking up human possessions. Be on board when Prince Eric gets in his boat to battle the evil Sea Witch, Ursula. Then get ready to lead Ariel out of the water and into the arms of her true love, Eric.

TIGER ELECTRONICS
INC. TM

THE TIME TEAM

BRINGING UP BABY

By Curtis Slepian

"Hey, Sean, here comes your girlfriend, Jenny."

Sean Nolan and his buddy Mickey were standing outside Pizza House at the mall. His face reddening, Sean said to Mickey, "Jenny Lopez isn't my girlfriend."

Mickey sneered, "Then how come you hang out with her so much?"

"We don't hang out. She, uh, helps me with my math homework."

Passing by, Jenny said, "Sean, can we talk?"

As Sean walked off with her, Mickey cracked, "Studying math?"

Jenny said to Sean, "I wondered if you'd like to go time-traveling with me after I babysit at Mrs. Breen's tonight?"

Sean stammered, "Is this, like, a date?"

Jenny made a face. "Get real. You're the only person I can travel through time with."

"Oh. Yeah, right."

"Do you want to help me take care of Mrs. Breen's baby?" asked Jenny.

"No way!" exclaimed Sean.

Later that evening, Jenny came over to Sean's house. In Sean's room, Jenny pulled out her tachyon machine, and pressed the button.

The next thing the teens knew they were on a dry, hot plain dotted with trees. Jenny looked around, then looked up. She saw what seemed to be a small airplane. But, airplanes didn't have long beaks. This was a giant, featherless bird! Drifting by the teens, it made a loud crying noise. Suddenly, Sean and Jenny heard a louder noise from above them.

They climbed a sandy hill and peeked over its edge. "I don't believe it," gasped Sean. What they saw were dinosaurs! Hundreds of them! They were bigger than elephants, with strange horned heads. They walked on two legs, but stood on four legs. And they made a racket! Honking, squeaking, trumpeting. Some were lounging in the sun, others were munching on the leaves of tall trees.

The teens sneaked behind a group of oak trees to better watch the herd. But what caught their attention was the sight of baby dinosaurs hatching from eggs. The babies were in a nest covered with leaves when they burst through their shells. Their mother came up to them and dropped food from her mouth into the nest.

"I thought dinosaurs were reptiles," said Sean. "But reptiles don't care for babies this way."

Jenny frowned. "Lots of scientists think dinosaurs aren't reptiles. They think they are related to birds. You know what? I've read about these guys: I bet they're Maiasaurs. Which means we've popped into the Cretaceous period—about 80 million years ago."

"Sometimes you're totally annoying, but you



really know your dinosaurs," said Sean in admiration.

Suddenly, there was a wild trumpeting sound. All the dinosaurs looked up. The teens felt the ground vibrate, and from nearby woods came a crunching noise. Then it appeared.

"This is so far out," cried Sean. "A Tyrannosaurus rex!" Coming out of the trees was a huge dinosaur with a mouth full of giant teeth.

"It's not big enough to be a Tyrannosaurus," corrected Jenny.

Look Who's Honking

It moved near the herd, like a hungry customer at a salad bar. The mother Maiasaurs grabbed their babies in their mouths. Then the herd started to run, raising a cloud of dust. The meat-eater caught the slowest-moving Maiasaur, dragging it into the woods.

"If he sees us, we're dead meat," said Jenny. "Squirrk!"

"Did you hear that?" asked Sean.

Jenny listened carefully. "It came from a nest."

Both teens peered down into the mud crater. They gasped. Inside was a baby Maiasaur!

"He got left behind," said Sean.

"How do you know it's a he?" shot back Jenny.

The baby was crying. A foot long, it was too small to climb over the top of its nest.

"We can't leave the baby," said Jenny.

"Well, we can't take it home with us."

"We've got to find its mother," observed Jenny. "Until then, we'll take care of it."

"You're a nutcake supreme," shouted Sean.

"You don't know anything about raising a baby dinosaur!"

"If I can babysit Mrs. Breen's kid, I can babysit Mrs. Maiasaur's kid," said Jenny. Sean sighed. Jenny could be stubborn.

Jenny picked up the dinosaur. "I'm going to name her Lucy."

"How do you know it's a she?" smirked Sean.

"Squirk! Hernnk!"

"Lucy is hungry—look for food," Jenny ordered.

Searching a wooded area, Sean spotted berry bushes. He ripped off a handful and held them out to Lucy. The little dinosaur took a berry in its mouth. But right away she dropped it.

Jenny was upset. "The food is too big for her to swallow. Sean, chew it for her."

"Gross me out," he said. But he munched on some berries, then promptly spit them out into his hand. This time Lucy ate eagerly. "Hold her," said Jenny. "She's getting heavy."

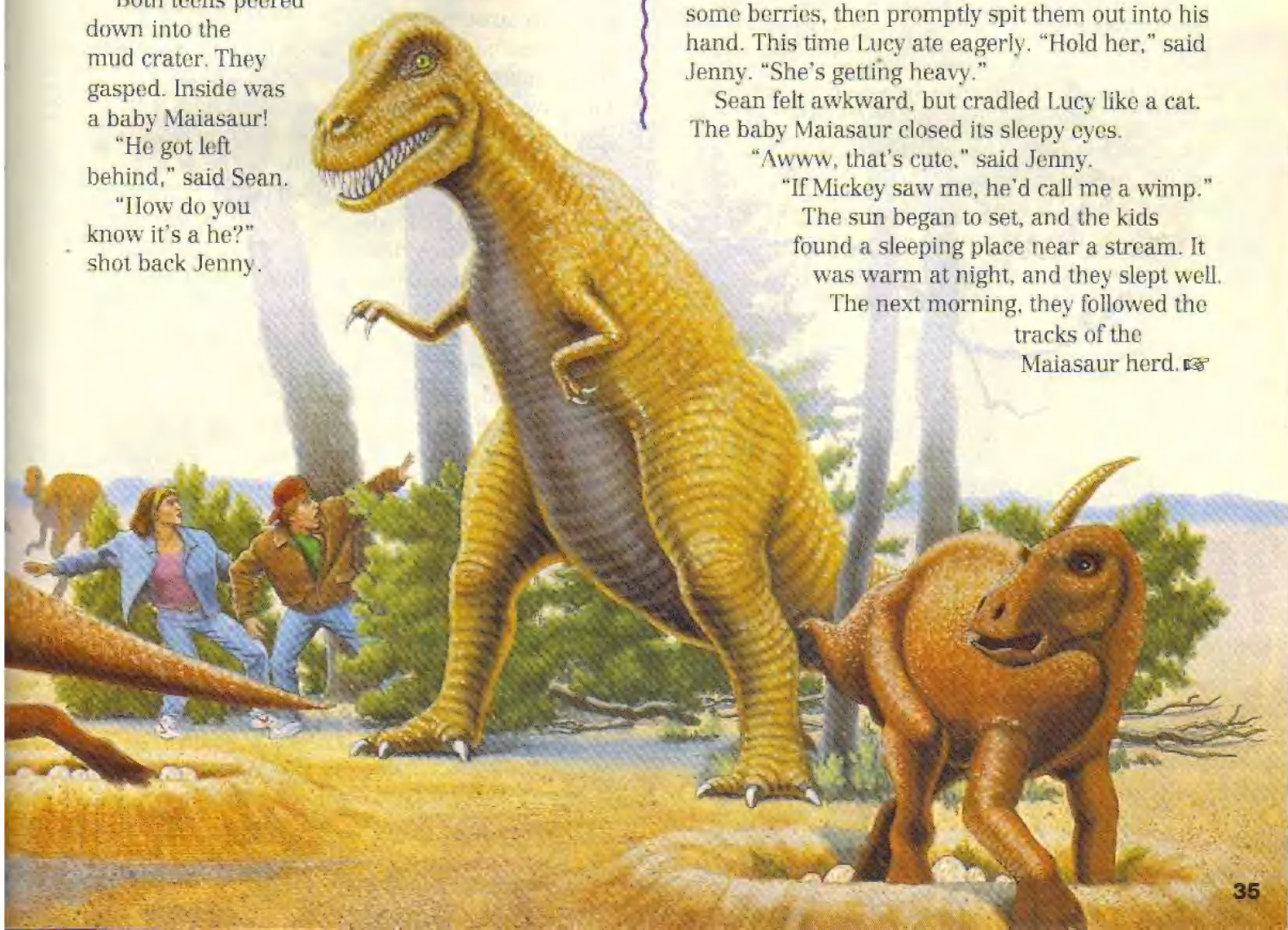
Sean felt awkward, but cradled Lucy like a cat. The baby Maiasaur closed its sleepy eyes.

"Awww, that's cute," said Jenny.

"If Mickey saw me, he'd call me a wimp."

The sun began to set, and the kids found a sleeping place near a stream. It was warm at night, and they slept well.

The next morning, they followed the tracks of the Maiasaur herd. ☞



Over the next few days, the teens avoided some grazing Triceratops and a dozing Hypacrosaur. But when Sean and Jenny felt safe, they played with Lucy. Soon they became attached to her. She was like a favorite pet—but even more so.

About a week later, Sean and Jenny stopped to rest near a stream. A furious honking roused them from a snooze. A dinosaur was standing over Lucy, saliva dripping from its razor-sharp teeth. It was about Sean's height, but moved lightning-fast. Sean jumped up. He was about to go after the dinosaur, when he stopped to think: "Hey, I couldn't even make the football team. How am I going to tackle a dinosaur?" Then he thought: "But I am a pretty good baseball player." He quickly broke off a tree branch and swung it at the meat-eater.

Seeing something as odd as Sean, the dinosaur screeched like an eagle. Sean swung the stick harder, hitting the creature's nose. With another screech, the bewildered dinosaur ran away.

Jenny rushed over. "Sean, sometimes you're a pretty cool guy."

"No big deal," blushed Sean.

While they rested, Sean sat by himself and thought about Jenny. A few minutes later, Jenny strolled up to Sean. She saw he was carving something with a housekey into the limb he had used as a baseball bat. When he heard her coming, he tossed the limb into a swamp. It quickly sank.

Jenny fell down in a heap.

"The Maiasaurs must have traveled through this swamp. There's no way *we* can get through it." She watched Lucy, who had grown in length another foot, chase a giant winged insect. "But we can't just leave Lucy by

herself. She'll never survive."

Both teens felt exhausted. They had been in this beautiful but dangerous world for more than a week and wanted to go home. Just then, a slow-moving dinosaur stopped nearby for a meal of hickory leaves. It had a long tail, armor on its back and looked as harmless as a cow.

A Dino-mite Idea

The dinosaur strolled lazily towards the swamp. Jenny screwed up her face in thought. "Maybe we can hitch a ride through the swamp."

"Ride on!" Sean joked. Both teens climbed onto the back of the dinosaur. To the giant creature, the teens felt like flies. It half-heartedly swatted at them with its tail. But they held tight to its saddle-like armor. The dinosaur soon forgot they were there. It lumbered across the dank swamp. "Look at me! I'm a Cretaceous cowboy!" howled Sean.

Several hours later, the teens and their "horse" had reached the swamp's other side. In the distance was a herd of Maiasaurs. After getting off, Sean asked, "How are we going to find Lucy's mother? All Maiasaurs look alike to me."

But not to Lucy. She wriggled out of Jenny's arms and honking loudly, waddled over to a large Maiasaur. The two rubbed faces. "She didn't say goodbye," said a teary-eyed Jenny. "I love Lucy."

"I guess I'll miss that little Maiasaur," said Sean.

As the herd wandered away, the two teens sprawled in the grass. "What next?" asked Sean. "Explore more of this prehistoric world? Study more dinosaurs up close and personal?"

"No. Now we go home and take baths," replied Jenny crisply. She took out her tachyon machine and hit the start button. Instantly, the two teens were back in Sean's room.

Months later, Jenny visited her local natural history museum. There was an exhibit on Cretaceous fossils from North America. As she passed a case, a fossil caught her eye—a piece of petrified wood. The description said, "Note the unusual markings made by natural wear and tear." Jenny examined the wood carefully. It almost looked as if initials had been carved into it: SN & JL.

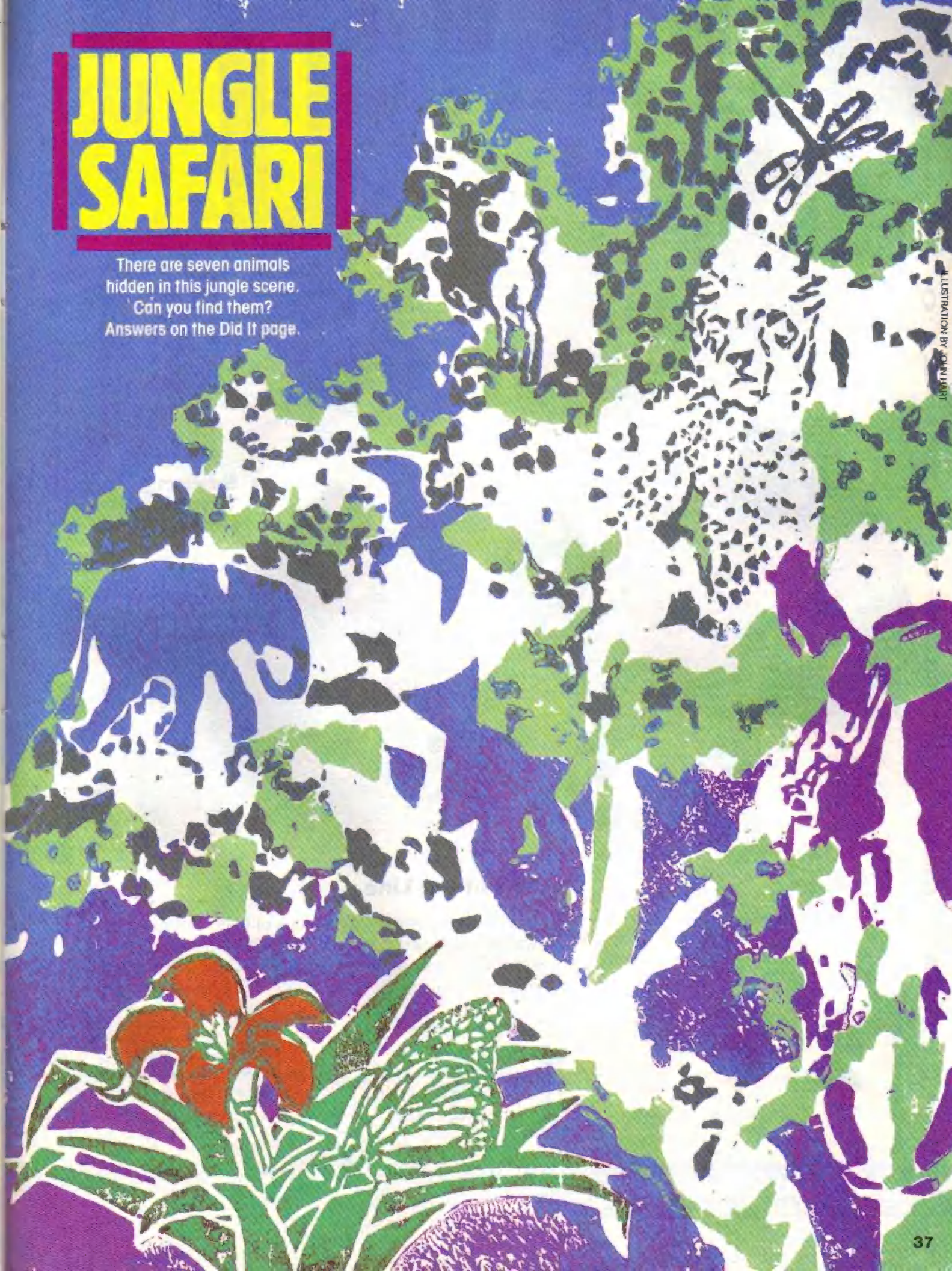
No, it couldn't be! Or could it...? ♦



JUNGLE SAFARI

There are seven animals
hidden in this jungle scene.
Can you find them?
Answers on the Did It page.

ILLUSTRATION BY JOHN LAMPT





◀ Stranger Than Paradise

Draw a straight line so that it divides the dice into two groups, each adding up to the same total.

▼ End of the Line

There is a pattern in this line of tiles. Can you guess which of the tiles in the circle should go next? (HINT: To solve this tricky puzzle, you'll need to look at the colors and the numbers.)



Z

Z

L

E

S



ILLUSTRATION BY PAUL RICHER

▲ Fistful of Dollars

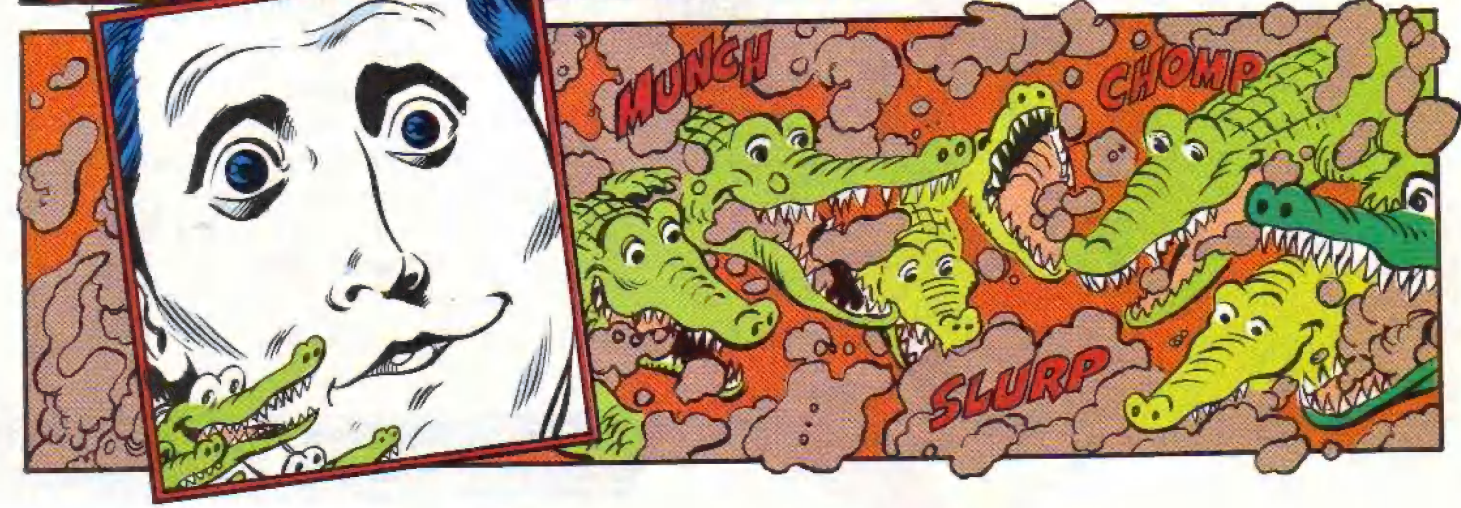
Can you figure out which group is worth the most money? Wait! Don't just add them up. The three rules below change the value of some of the bills. (In this puzzle, all numbers stand for dollars.)

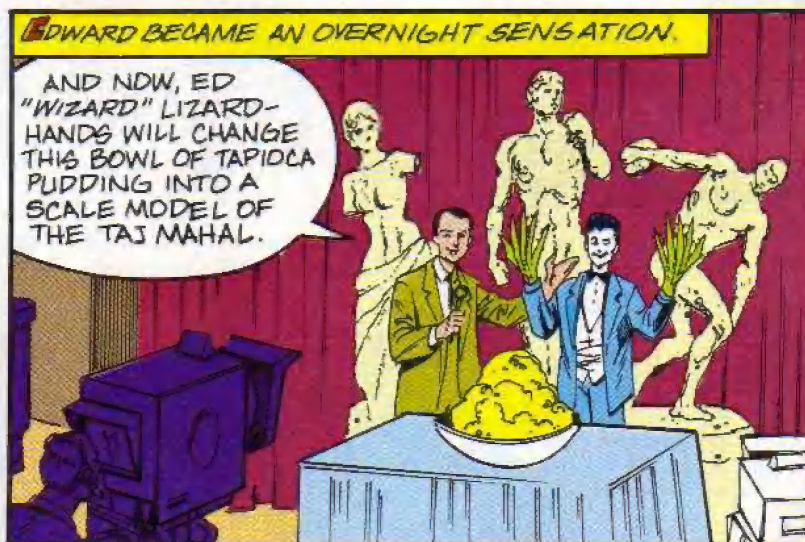
Rules:

1. Red bills are worth zero.
2. Green bills are worth three times their printed value.
3. White bills are worth twice the value of the smallest bill in the hand.



Answers on the Did It page.





MATHNET DETECTIVE



By Marvin Miller

MESSAGE IN A BOTTLE

Two high school students went hiking. One was Belinda, the president of the math club. The other was Alan, a world-class spelling bee champ. They disappeared near a river. Two days later, a search party found a note inside a bottle that was floating downstream:

Can you answer the following questions?

1. What was the date of the note, including the month?
2. Who wrote the note? Alan or Belinda?
3. Which arm or leg did the note writer break?
4. Are they on the east bank or the west bank of the river?

June 6, 1991
Help! We tripped and fell into a hole. My friend was knocked out and I broke one of my limbs. We're lost. I ran to the river bank where I found this bottle. I hope the bottle reaches someone.
Here are some landmarks so you can find us. Behind me is a very tall tree. On the other side of the river I see a high mountain with the sun setting behind it.



LOOK OUT BELOW: A RIDDLE

A police officer fell off a 30-foot-tall ladder while she was trying to rescue a cat caught in a tree. But the officer wasn't hurt. Not even a scratch. HOW COME?

Answers on the Did It page.



CONTACT

LENS

CROPPED PICTURE

This farmer really knows where to draw the line! Using a plow as a paintbrush, his field blooms into a work of art. The tractor near the bottom of the vase helps keep this picture perfect.

For years, many farmers across America have been turning their crops into fields of dreams. In some counties where farmers fly to work or into town in their own planes, there are contests in land art. What do these "landscape artists" paint? A feast for the eyes, naturally.

BASIC TRAINING

Programs For Your Computer

SUPER ROACH

For IBM, Apple II and Commodore computers

In this game, you are a roach who must find food without getting squished. Don't let your hunger level reach 20 and try to stay alive for as many trips as you can.

The program is written for IBM computers. To play it on Apple II machines, change all the CLS commands to HOME. For Commodore 64/128, change CLS to PRINT CHR\$(147).

```

10 DIM FS(8,2),PS(10,3),ES(8,2)
20 FOR X=1 TO 8
30 READ AS:FS(X,1)=AS
40 READ AS:FS(X,2)=AS
50 NEXT X
60 FOR X=1 TO 10
70 FOR Y=1 TO 3
80 READ AS:PS(X,Y)=AS
90 NEXT Y:NEXT X
100 FOR X=1 TO 8
110 READ AS:ES(X,1)=AS
120 READ AS:ES(X,2)=AS
130 NEXT X
140 R=2:H=10:P=9:T=0
150 CLS
160 PRINT "GOOD MORNING,
    ROACH."
170 PRINT "THERE ARE NOW ";R;"
    ROACHES IN THE KITCHEN."
180 PRINT "YOUR HUNGER LEVEL
    IS ";H
190 "YOU HAVE MADE ";T;" TRIPS
    FOR FOOD"
200 PRINT:PRINT "YOU ARE NOW
    ";PS(P,1)
210 IF PS(P,3)="0" THEN 260
220 IF R<1200 THEN 280

```

```

230 X=INT(RND(1)*2)+1
240 IF X=1 THEN 280
250 PRINT "SOME OTHER ROACH
    WAS HERE FIRST"
260 PRINT "THERE'S NOTHING TO
    EAT HERE."
270 GOTO 330
280 F=INT(RND(1)*8)+1
290 PRINT "YOU SEE
    SOME";FS(F,1)
300 PRINT "DO YOU WANT TO
    STICK AROUND TO EAT? (Y/N)"
310 INPUT RS
320 IF RS="Y" THEN 360
330 H=H+1
340 PRINT "YOU CRAWL ON,
    ENDLESSLY SEARCHING FOR
    FOOD."
350 GOTO 510
360 X=INT(RND(1)*10)+1
370 IF X>VAL(PS(P,2)) THEN 490
380 E=INT(RND(1)*8)+1
390 PRINT "YOU STOP TO EAT THE
    ";FS(F,1)
400 PRINT "BUT SUDDENLY, A
    GIANT ";ES(E,1);" APPEARS!!"
410 IF VAL(ES(E,2))>10 THEN 620
420 X=INT(RND(1)*10)+1
430 IF X<=VAL(ES(E,2)) THEN 650
440 PRINT "USING THE ABILITIES
    DEVELOPED BY YOUR KIND"
450 PRINT "THROUGH MILLIONS
    OF YEARS OF EVOLUTION"
460 PRINT "YOU ESCAPE"
470 PRINT "BUT YOU DON'T GET
    ANYTHING TO EAT."
480 H=H+2:GOTO 510
490 PRINT "QUICKLY, YOU
    DEVOUR THE ";FS(F,1)
500 H=H-VAL(FS(F,2))
510 IF H<0 THEN H=0
520 IF H>19 THEN PRINT "YOU
    DIED OF HUNGER":GOTO 660
530 P2=P
540 P=INT(RND(1)*8)+1
550 IF P=P2 THEN 540

```

```

560 IF R>60000! THEN 580
570 R=R+R
580 T=T+1
590 PRINT "PRESS RETURN TO
    CONTINUE"
600 INPUT RS
610 GOTO 150
620 PRINT "YOU ESCAPE, BUT THE
    EXTERMINATOR"
630 PRINT "WIPES OUT MOST OF
    THE OTHER ROACHES IN THE
    KITCHEN"
640 R=2:H=H+1:GOTO 510
650 REM THE END
660 PRINT "YOUR LIFE AS A
    COCKROACH IS OVER."
670 PRINT "BUT YOUR SPECIES
    WILL LIVE ON FOREVER."
680 PRINT "YOU LASTED ";T;" TRIPS"
690 IF T>=30 THEN SS="SUPER"
700 IF T<30 THEN SS="WONDER"
710 IF T<20 THEN SS="GOOD"
720 IF T<10 THEN SS="NOT VERY
    SMART"
730 PRINT "YOU ARE A";SS;" ROACH."
740 PRINT "WOULD YOU LIKE TO
    PLAY AGAIN? Y/N"
750 INPUT RS
760 IF RS="Y" THEN 140
770 PRINT "BYE-BYE, ROACH!"
780 END
790 DATA CAKE,5,OLD BANANA,3,
    BREAD CRUMBS,2,ORANGE
    RIND,2
800 DATA SALAMI,3,SOAP,0,
    FINGERNAIL CLIPPINGS,1,
    CAT FOOD,4
810 DATA BEHIND
    REFRIGERATOR,2,1,UNDER
    SINK,2,1,ON
    COUNTER,8,1,ALONG THE
    WALL,3,1
820 DATA IN MIDDLE OF FLOOR,
    9,1,UNDER TABLE,6,1,ON
    CEILING,1,0,ON TABLE,9,1
830 DATA INSIDE WALL,0,0,UNDER
    TOASTER,3,1
840 DATA EXTERMINATOR,99,CAT,
    9,FOOT,2,HAND,5,POISON
    SPRAY,8,ROACH MOTEL,4
850 DATA ROLLED UP
    NEWSPAPER,2,LIZARD,8

```

SEND US YOUR PROGRAMS



THE SLIPPED Disk SHOW

Cheerio, computer chappies! This is your old buddy, Slipped Disk, the coolest computer expert with the hottest computer information anywhere. How do I know my computer information is so hot? Because my air-conditioner is broken! It must be about 110 degrees in this studio.

But have no fear, because Floppy and I are going to stay right here and answer your computer-type questions. (Floppy is my loyal assistant and fellow computer expert, who also happens to be my dog.) So just bear with us because it's hard to answer questions while you're panting from the heat with your tongue hanging out. And Floppy isn't feeling too great either.

So let's open the first letter, which is from **Mike Olson** of Columbia Heights, MN. Mike asks:

"Are calculators computers?"

Mike, calculators are electronic animals that add and subtract, eat grass, give milk and go moo a lot. Wait a minute, that's a cow-culator! You wanted to

know about *calculators*. Yes, Mike, electronic calculators *are* computers. Calculators contain microchips that work the way the microchips in larger computers work. Of

course, calculators are very simple compared to even an Apple II or Commodore 64 computer. They can only do a handful of mathematical operations, you can't program them and

Seth Hoehn of New Harmony, IN. Badger asks:

"How do magnets erase computer disks?"

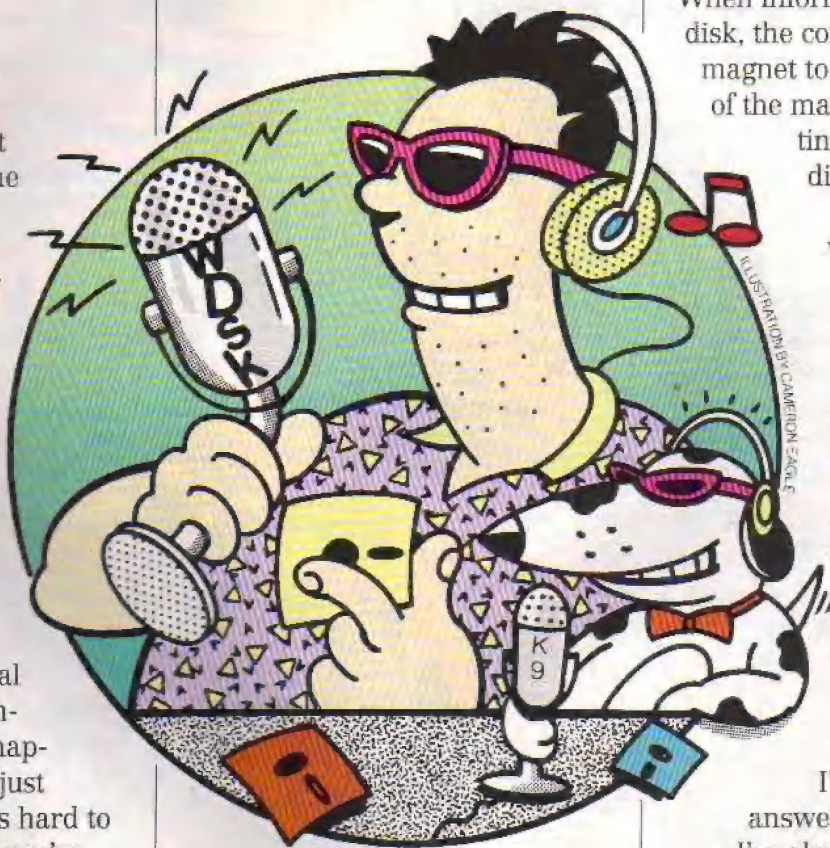
Seth, magnets erase computer disks by changing the *polarity* of the tiny magnetic particles on the disk. Let me explain.

On a floppy disk or a hard disk, there is a coating of tiny, microscopic bits of metal that act like magnets. They each have a positive and negative pole. When information is stored on a disk, the computer uses a larger magnet to change the direction of the magnetic fields of the tiny magnets on the disk.

When a disk is written on, the positive and negative poles of the tiny magnets are arranged in an order that makes up a code. But if you take a magnet and run it over your disk, you'll change the direction of the magnetic fields, and the code will be destroyed. And I'm positive that's the

answer.

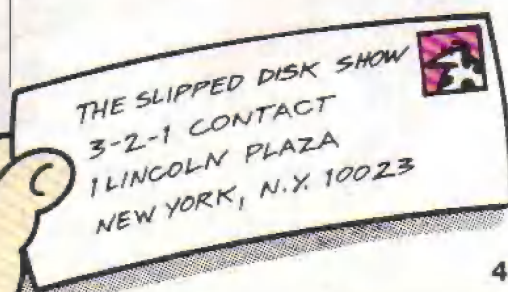
I'm also positive that we're out of time for this month's show. But we'll be back next issue, so don't forget to send in your computer questions to:

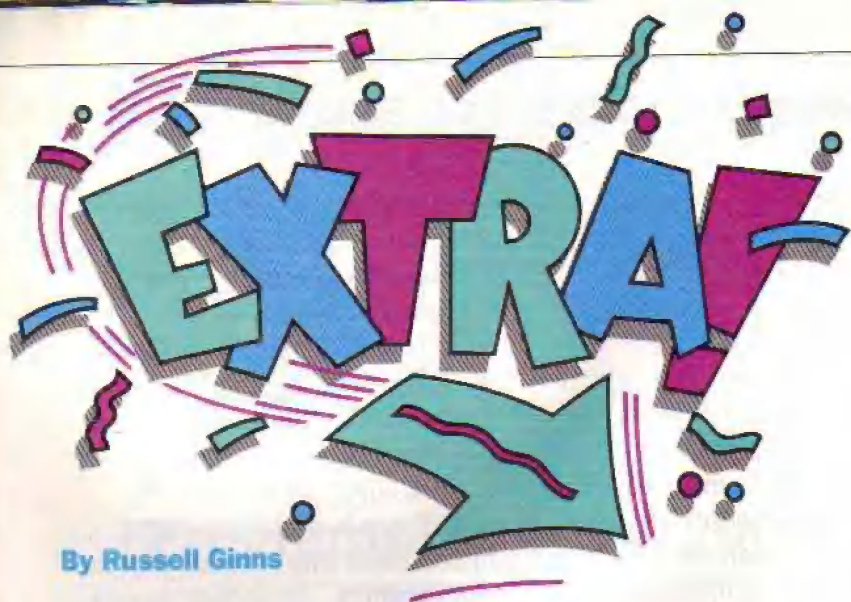


they can't run software.

Calculators may seem simple when you compare them to other electronic computers, but they're light years ahead of the machines people once used to do their figuring, such as adding machines, slide rules and the abacus.

The next question is from a dog! That's right, it's from a Chihuahua named Badger, whose owner is



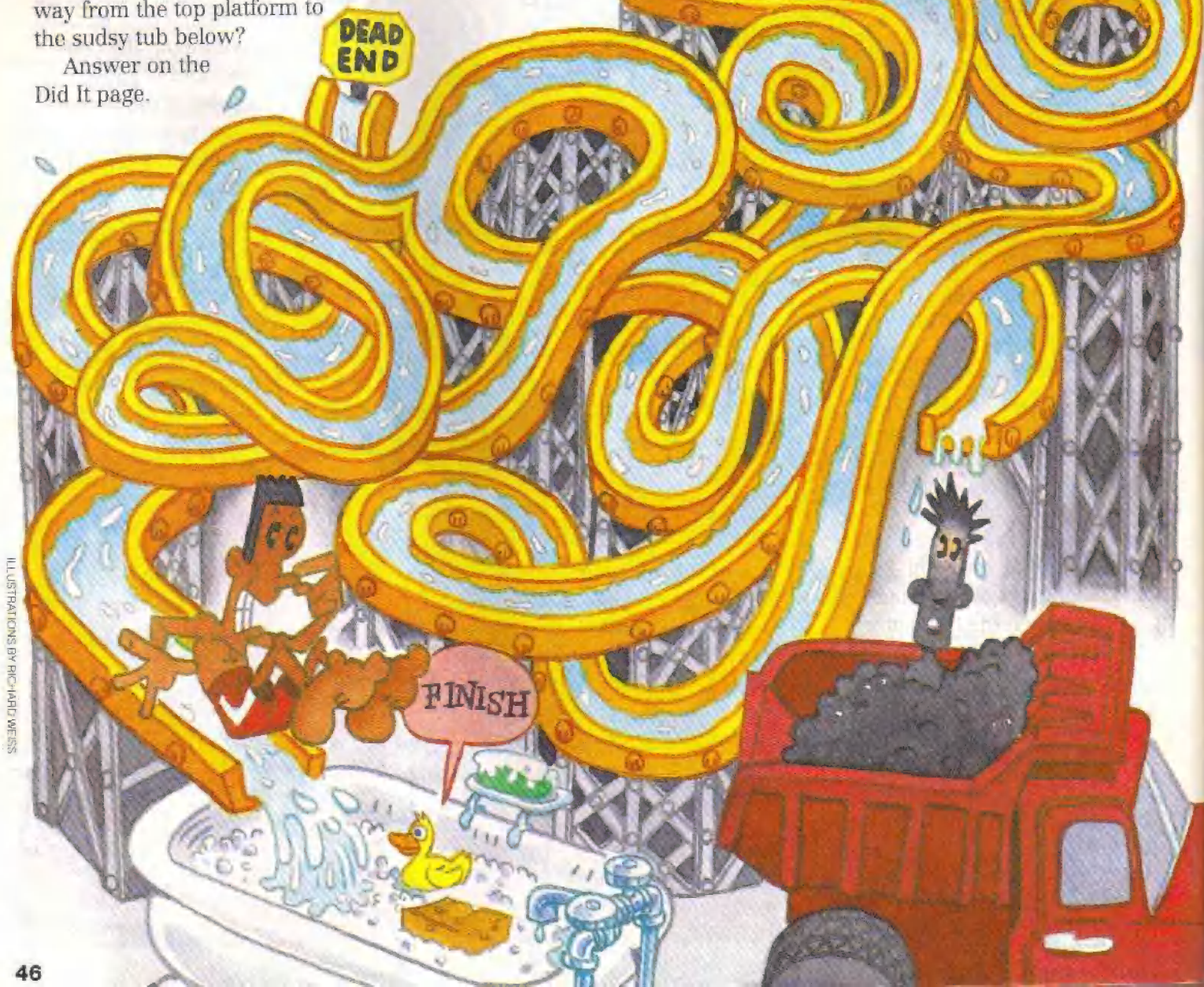


By Russell Ginns

SLIP-SLIDERS AWEIGH!

Welcome to Cleanworld, the amusement park where everyone goes home squeaky clean. This summer, the hottest new ride is the Supersonic Soap Slide. Can you find a path that shoots all the way from the top platform to the sudsy tub below?

Answer on the Did It page.



ILLUSTRATIONS BY RICHARD WESS

SHOCKROACH

Professor Palpi stepped into her lab one night and discovered the largest-known specimen of Madagascar hissing roach. But while the professor was busy classifying this big bug, it was busy classifying the professor. Can you help the giant cockroach decide what kind of scientist Professor Palpi is?

To do this, figure out which name (in the list below) the clues refer to. That name applies to Professor Palpi.

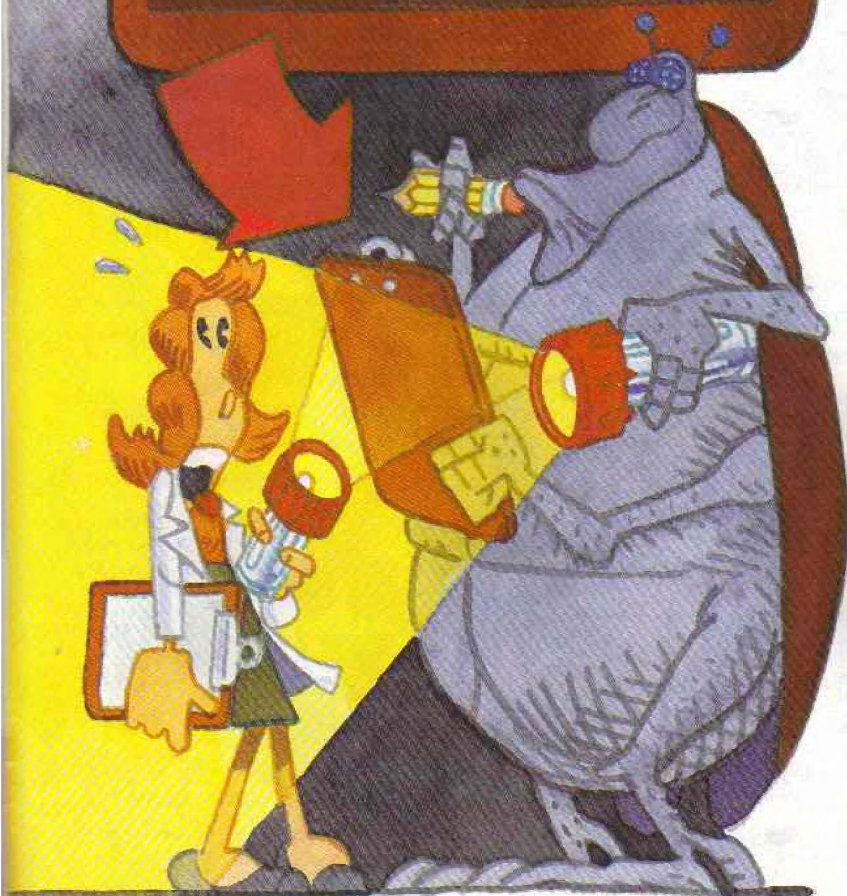
The answer is creeping across the Did It page.

NAMES

ORNITHOLOGIST
PHRENOLOGIST
ENTOMOLOGIST
SEISMOLOGIST
ETYMOLOGIST
OPTOMETRIST

CLUES

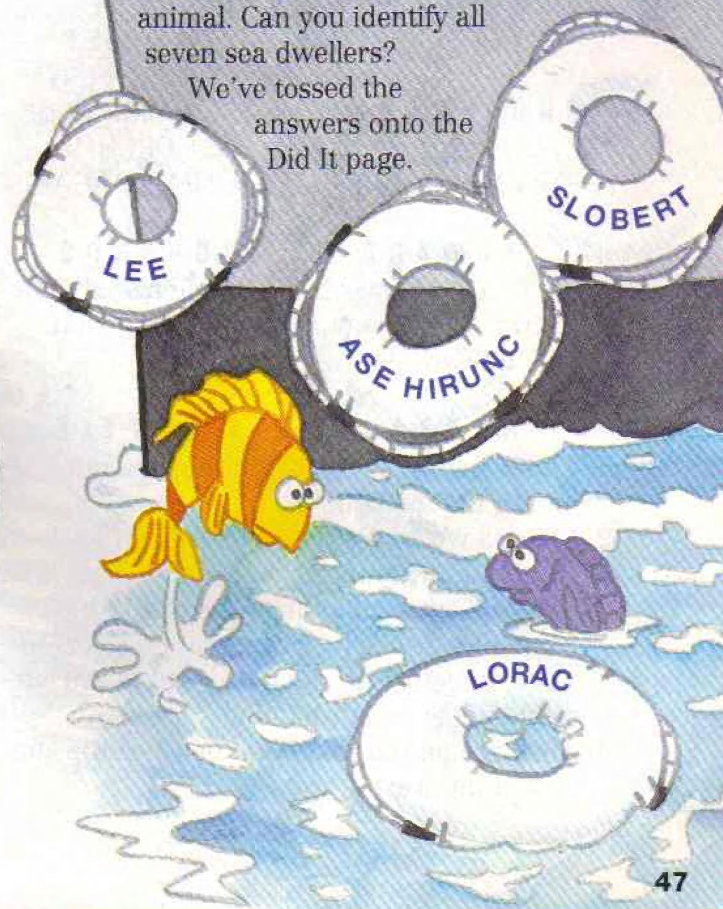
1. The name must contain an "N."
2. The name is 12 letters long.
3. The name does *not* contain a "P."



REEF RELIEF

Captain Herringbone rushed out to rescue the Great Barrier Reef and tossed a bunch of life preservers into the water. Unfortunately, it will take much more than that to save the coral reefs of the world. But if you look closely, you'll see that each ring contains the scrambled name of a reef animal. Can you identify all seven sea dwellers?

We've tossed the answers onto the Did It page.

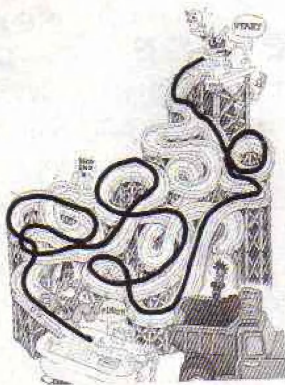


Did it

STRANGER THAN PARADISE



SLIP-SLIDERS AWEIGH!



SHOCKROACH

Answer:
ENTOMOLOGIST

EDWARD LIZARDHANDS

There are 10 lizards. Each one has 20 toes. $10 \times 20 \times 3 = 600$ hours, or 25 days. That means Edward gets off scot-free!

MESSAGE IN A BOTTLE

1. The date was June 6th. June is the only month that ends in "E."
2. Belinda wrote the note. A spelling bee champ wouldn't have misspelled "bottle" and "friend."
3. She broke her right arm. It couldn't have been a leg because she ran to the river. Also, the letters in the note slant to the left, so she must be left-handed.
4. They are on the east bank because the sun sets in the west.

END OF THE LINE



FISTFUL OF DOLLARS



REEF RELIEF

CRAB, FISH,
LOBSTER, EEL,
SEA URCHIN,
CORAL, ALGAE.

JUNGLE SAFARI



LOOK OUT BELOW

The officer fell off the first step.

NEXT MONTH

A back-to-school bonanza is coming your way in September!

MARS, HO!

A manned voyage to Mars is the next great goal of the space program. Here is an imaginary—but true-to-life—diary of such a journey. It will make you feel like a crewmember on your way to the Red Planet.

THEY WOULD CUT WOOD

When lumber companies cut down forests, they never grow back—or do they? We visit a Tennessee lumber company to find out the important answers—firsthand.

CORRECTION

In our March 1991 issue, our TNT News Blast was about Arctic terns. But we used a photo of puffins. OOPS! Thanks to all of our eagle-eyed CONTACT readers who wrote in to tell us. We really *nest* up!

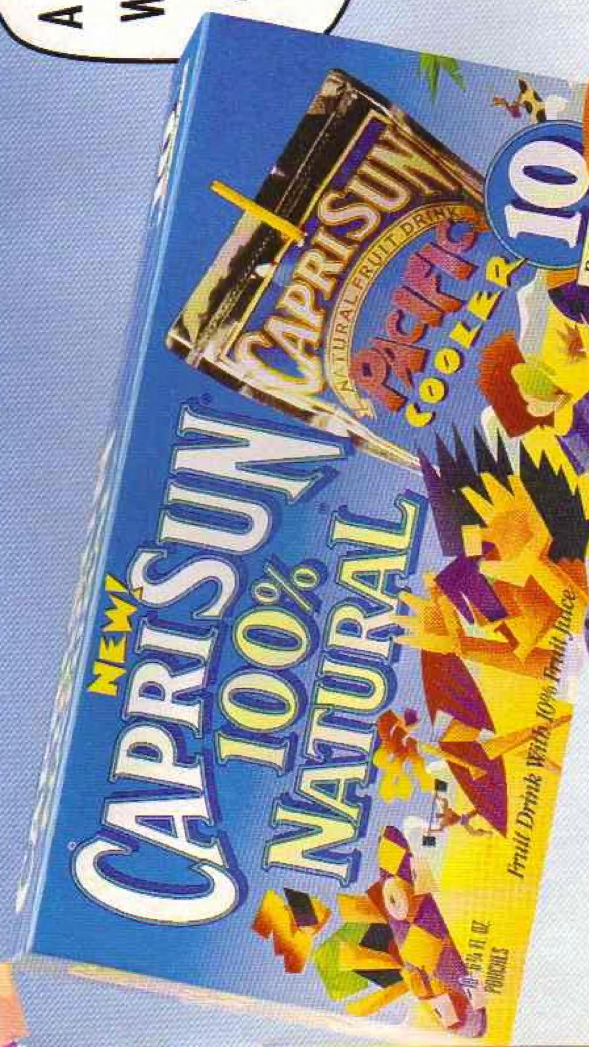
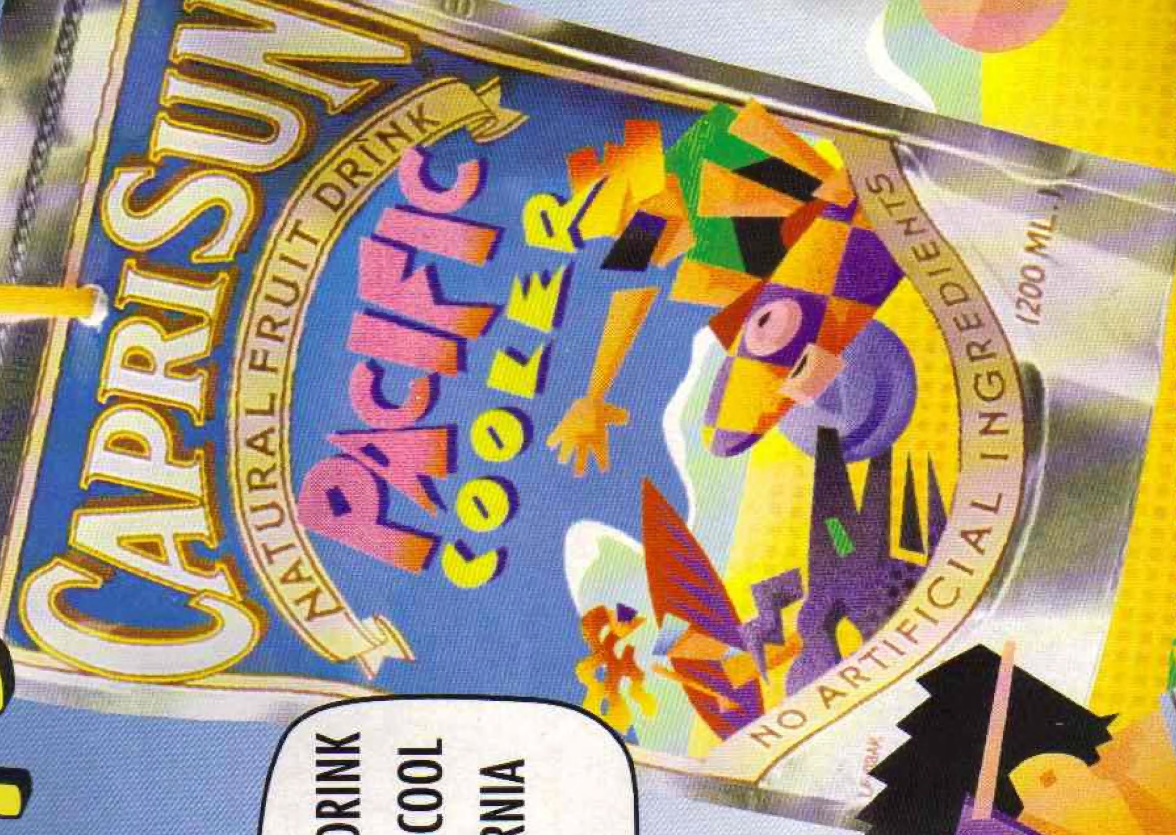
WHAT MAKES A RABBIT A RABBIT?

Join Z Wright and Stephanie Yu and find out all about our tiny living instructions, the gene code, on *Secrets of the Code*, a 3-2-1 CONTACT EXTRA! Coming in July on PBS... Check local listings for time and date.



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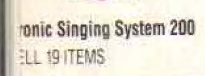
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SELL 14 ITEMS



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Talking Electronic Game
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